California Environmental Quality Act

Initial Study

(State Clearinghouse No. 2019049076)

Fresno City College Parking and Facilities Expansion Project

Fresno, California

Lead Agency and Project Sponsor:

State Center Community College District

October 2019

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Executive Summary

The Fresno City College Parking and Facilities Expansion Project (project), to be undertaken by State Center Community College District (SCCCD), proposes the development and operation of new parking, educational, and administrative facilities for Fresno City College (FCC). The proposed project site encompasses approximately 11.0 acres on and adjacent to the northeastern area of the existing FCC campus, generally located on the west side of Blackstone Avenue between Cambridge Avenue and University Avenue in the City of Fresno. The project would increase the total size of the FCC campus (currently 103 acres) by 2.16 acres.

Facilities proposed as part of the project include a four-story parking structure with capacity for up to 1,000 vehicles; a three-story, 95,000-sqaure-foot Science Building; a new two-story, 16,480-square-foot Child Development Center; and a new 10,000-square-foot Maintenance & Operations Building with surface parking area. Development of the proposed project entails removal of the existing Child Development Center and Maintenance & Operations facilities buildings on the FCC campus; two existing residential structures located north of the existing campus; and two commercial structures located east of the existing campus. The project additionally entails repurposing of the former District Office building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department and District administrative functions. Operation of the project, upon development, would generally continue to accommodate students, faculty, administrators, and support staff in a manner similar to that of the existing FCC campus (i.e. by providing opportunities for public community college instruction, with related educational and administrative activities also occurring).

Based on the California Environmental Quality Act Guidelines ("CEQA Guidelines"), the purpose of this Initial Study is to provide State Center Community College District (also referred to as "SCCCD" or "District") with environmental information about the project to use as the basis for deciding whether to prepare an Environmental Impact Report or a Negative Declaration for the project.

The conclusions of the Initial Study are as follows:

1. The Initial Study identified a number of potentially significant environmental effects of the project in the following subject areas: aesthetics, air quality, biological resources, cultural resources, energy, hydrology and water quality, noise, transportation, tribal cultural resources, and utilities and service systems. The District can avoid or reduce to an insignificant level these impacts by incorporating in the project the mitigation measures listed in Summary Table of Mitigation Measures on the following pages.
2. The project would have a less than significant impact or no impact on many of the environmental resources and conditions evaluated in the Initial Study. The Initial Study explains why there would be no impacts or the impacts would be less than significant.
3. Based on items 1 and 2, above, the District should adopt a Mitigated Negative Declaration for the project.

Summary Table of Mitigation Measures

Aesthetics	**Aesthetics: Mitigation for Potential Lighting and Glare Impacts** **AE-1.** The following measures shall be incorporated into development and operation of the project in order to reduce impacts from lighting and glare: a. All parking area lighting shall have full cut-off type fixtures. A full cut-off type fixture is a luminaire or lighting fixture that, by design of the housing, does not allow any light dispersion or direct glare to shine above a 90-degree horizontal plane from the base of the fixture. Full cut-off type fixtures must be installed in a horizontal position as designed. b. All external signs and lighting shall be lit from the top and shine downward except where uplighting is required for safety or security purposes. The lighting shall also be, as much as physically possible, contained to the target area.

	c. Exterior building lighting for security or aesthetics shall be full cut-off or a shielded type design to minimize any upward distribution of light. d. No later than 10:00 p.m., lighting at project facilities not needed for safety or security purposes shall be turned off, and the parking garage entrance/exit at Cambridge Avenue shall be closed. The Cambridge Avenue entrance/exit shall be equipped with gating or other equipment suitable for restricting access to the parking structure while also minimizing light and glare emitted from the interior of the parking structure.
Air Quality	**Air Quality: Mitigation Measures to Reduce Localized Pollutant Concentrations** The following measures shall be implemented to reduce potential expose of sensitive receptors to localized concentrations of construction-generated PM at nearby sensitive receptors and land uses during project construction. The term "construction" as used here shall refer broadly to pre-operational site preparation activities, including but not limited to, demolition, grading, and paving. **AQ-1.** Demolition of onsite structures shall comply with all applicable regulatory requirements, including, but not limited to, SJVAPCD Rule 4002 (NESHAP), and National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M - asbestos NESHAP), Lead in Construction Standard (29CFR1926.62) and California Code of Regulations Title 8, Section 1532.1, Lead. These requirements may include: 1) responsible agency notifications, 2) lead-based paint or asbestos surveys, and, 3) applicable removal and disposal requirements. More information on asbestos-containing materials and applicable regulatory requirements can be found at website url: https://www.valleyair.org/newsed/asbestos.pdf. Additional information regarding lead-based paint and applicable regulatory requirements can be found at website URLs: https://www.epa.gov/lead/lead-abatement-inspection-and-risk-assessment and https://www.dir.ca.gov/title8/1532_1.html. **AQ-2.** On-road diesel vehicles shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles: a. Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location, except as noted in Subsection (d) of the regulation; and, b. Shall not operate a diesel-fueled auxiliary power system to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation. **AQ-3.** Off-road diesel equipment shall comply with the five-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use Off-road Diesel regulation. The specific requirements and exceptions in the regulations can be reviewed at the following website URLs: www.arb.ca.gov/msprog/truck-idling/2485.pdf and www.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf. **AQ-4.** Signs shall be posted at the project site construction entrance to remind drivers and operators of the state's five-minute idling limit. **AQ-5.** To the extent available, replace fossil-fueled equipment with alternatively-fueled (e.g., natural gas) or electrically-driven equivalents.

	AQ-6. Construction truck trips shall be scheduled, to the extent possible, to occur during non-peak hours, and truck haul routes shall be selected to minimize impacts to nearby residential dwellings. **AQ-7.** The burning of vegetative material shall be prohibited. **AQ-8.** Low VOC-content (50 grams per liter, or less) exterior and interior building paints shall be used. To the extent locally available, use prefinished/pre-colored materials. **AQ-9.** The proposed project shall comply with SJVAPCD Regulation VIII for the control of fugitive dust emissions. Regulation VIII can be obtained on the SJVAPCD's website at website URL: https://www.valleyair.org/rules/1ruleslist.htm. At a minimum, the following measures shall be implemented: a. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover. b. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant. c. All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut & fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking. d. When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained. e. Trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.) f. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant. g. On-road vehicle speeds on unpaved surfaces of the project site shall be limited to 15 mph. h. Sandbags or other erosion control measures shall be installed sufficient to prevent silt runoff to public roadways from sites with a slope greater than one percent. i. Excavation and grading activities shall be suspended when winds exceed sustained speeds of 20 miles per hour (Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation). **AQ-10.** The above measures for the control of construction-generated emissions shall be included on site grading and construction plans.
Biological Resources	**Biological Resources: Mitigation for Potential Impacts to Nesting Migratory Birds** **BR-1:** 1. Avoidance: If feasible, any vegetation removal within the project area shall take place between September 1 and February 1 to avoid impacts to nesting birds in compliance with the Migratory Bird Treaty Act (MBTA). No surveys will be required if project timing occurs outside the bird breeding season. If vegetation removal must occur during the nesting season, project construction may be delayed due to actively nesting birds and their required protective buffers.

	2. <u>Pre-construction Surveys</u>: If construction is to begin during the nesting season (February 1 through August 31), a qualified biologist shall conduct a pre-construction survey within 14 days prior to initiation of disturbance activities. This survey will search for nest sites within the project area. If the pre-construction survey does not detect any active nests, then no further action is required. If the survey does detect an active nest, then the District shall implement the following: 3. <u>Minimization/Establish Buffers</u>: If any active nests are discovered (and if construction will occur during bird breeding season), the District shall contact the United States Fish and Wildlife Service and/or California Department of Fish and Wildlife to determine protective measures required to avoid take. These measures could include fencing an area where a nest occurs or shifting construction work temporally or spatially away from the nesting birds. Biologists would be required on site to monitor construction activity while protected migratory birds are nesting in the project area. If an active nest is found after the completion of the pre-construction surveys and after construction begins, all construction activities shall stop until a qualified biologist has evaluated the nest and erected the appropriate buffer around the nest.
Cultural Resources	**Cultural Resources: Mitigation for Potential Discovery of Subsurface Cultural Resources** **CR-1:** If previously unknown subsurface resources are encountered before or during excavation or grading activities, construction shall stop in the immediate vicinity of the find and a qualified historical resources specialist shall be consulted to determine whether the resource requires further study. The qualified historical resources specialist shall make recommendations to the District on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with Section 15064.5 of the CEQA Guidelines and the City of Fresno's Historic Preservation Ordinance. If the resources are determined to be unique historical resources as defined under Section 15064.5 of the CEQA Guidelines, measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. **CR-2:** In the event that buried prehistoric archaeological resources are discovered during excavation and/or construction activities, construction shall stop in the immediate vicinity of the find and a qualified archaeologist shall be consulted to determine whether the resource requires further study. The qualified archaeologist shall make recommendations to the District on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with Section 15064.5 of the CEQA Guidelines. If the resources are determined to be unique prehistoric archaeological resources as defined under Section 15064.5 of the CEQA Guidelines, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. **CR-3:** In the event that human remains are unearthed during excavation and grading activities of any future development project, all activity shall cease immediately. Pursuant to Health and Safety Code (HSC) Section 7050.5, no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98(a). If the remains are determined to be of Native American descent, the coroner shall

	within 24 hours notify the Native American Heritage Commission (NAHC). The NAHC shall then contact the most likely descendent of the deceased Native American, who shall then serve as the consultant on how to proceed with the remains. Pursuant to PRC Section 5097.98(b), upon the discovery of Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located is not damaged or disturbed by further development activity until the landowner has discussed and conferred with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.
Energy	**Energy: Measures to Reduce or Offset Energy Use** **E-1:** The following measures shall be implemented to reduce or offset energy use associated with the development of future land uses. These measures shall be shown on grading and building plans: • Meet or exceed CalGreen Tier 2 standards for providing EV charging infrastructure. • Meet or exceed CalGreen Tier 2 standards for using shading, trees, plants, cool roofs, etc. to reduce the "heat island" effect. • New buildings shall be designed to achieve a minimum 5-percent improvement beyond 2016 Title 24 building energy-efficiency standards with a goal of achieving net-zero energy use. • Utilize high efficiency lights in parking lots, streets, and other public areas. • Incorporate measures and building design features that reduce energy use, water use, and waste generation (e.g., light-colored roofing materials, installation of automatic lighting controls, planting of trees to provide shade). • Install energy-efficient appliances and building components sufficient to achieve overall reductions in interior energy use beyond those required at the time of development by CalGreen standards. • New buildings and parking structures shall be designed to accommodate rooftop solar photovoltaic systems. • Plant drought-tolerant landscaping and incorporate water-efficient irrigation systems where necessary. • Plant drought-tolerant, native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.
Geology and Soils	**Geology and Soils: Mitigation for Potential Discovery of Subsurface Paleontological/ Geological Resources** **GS-1:** In the event that unique paleontological/geological resources are discovered during excavation and/or construction activities, construction shall stop in the immediate vicinity of the find and a qualified paleontologist shall be consulted to determine whether the resource requires further study. The qualified paleontologist shall make recommendations to the District on the measures that shall be implemented to protect the discovered resources, including but not limited to, excavation of the finds and evaluation of the finds. If the resources are determined to be significant, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open

	space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources.
Hydrology and Water Quality; Utilities and Service Systems	**Hydrology and Water Quality: Mitigation for Potential Increase in Stormwater Runoff** **HW-1:** To the extent that projected runoff from proposed project development exceeds the capacity of the existing storm drainage system, mitigation will be required in the form of on-site retention or FMFCD system modifications, which must be reviewed and approved by FMFCD prior to implementation.
Noise	**Noise: Reduction of Construction-Generated Noise Levels** **N-1:** The following measures shall be implemented to reduce construction-generated noise levels. The term "construction" as used here shall refer broadly to pre-operational site preparation activities, including but not limited to, demolition, grading, and paving. a. Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 10:00 p.m. Construction activities shall be prohibited on Sundays and legal holidays. Construction truck trips shall be scheduled, to the extent feasible, to occur during non-peak hours and truck haul routes shall be selected to minimize impacts to nearby residential dwellings. b. Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation. c. Stationary construction equipment (e.g., portable power generators) should be located at the furthest distance possible from nearby residences. If deemed necessary, portable noise barriers shall be erected sufficient to shield nearby residences from direct line-of-sight of stationary construction equipment. d. When not in use, all equipment shall be turned off and shall not be allowed to idle. Provide clear signage that posts this requirement for workers at the entrances to the site. **Noise: Reduction of Long-Term Operational Noise Impacts** **N-2:** The following measures shall be implemented to reduce long-term operational noise impacts of the project: a. An acoustical analysis shall be prepared for proposed onsite buildings and facilities prior to final design of the project's proposed facilities. The purpose of the acoustical analysis will be to evaluate operational noise levels associated with on-site building mechanical equipment (e.g. air conditioning units, exhaust fans) in comparison to applicable City of Fresno exterior daytime and nighttime noise standards of 50 and 45 dBA L_{eq}. The acoustical analysis shall identify nose-reduction measures to be incorporated, if needed, that are sufficient to achieve applicable noise standards. Noise-reduction measures to be incorporated may include, but are not limited to, the selection of alternative or quieter equipment, use of equipment enclosures, site design, and construction of noise barriers (e.g. walls). b. Operation of the proposed Maintenance & Operations Building shall be limited to between the hours of 7:00 a.m. and 10:00 p.m.

	c. Stationary equipment (e.g. air compressors) to be located at the proposed Maintenance & Operations Building shall be enclosed and shielded from direct line-of-sight of nearby residential land uses. d. Exterior doors of the automotive service bay located within the proposed Maintenance & Operations Building shall be closed when using noise-generating equipment (e.g. pneumatic tools). e. Landscape maintenance and waste collection activities shall be limited to between the hours of 7:00 a.m. and 10:00 p.m. f. Any stationary equipment (e.g. air compressors) to be installed at the proposed Maintenance & Operations Building shall be enclosed, located at the furthest feasible distance from nearby residential land uses, and shielded from direct line-of-sight of nearby residential land uses.
Transportation	**Transportation: Mitigation for Transportation Circulation System Compatibility** **T-1:** To achieve an acceptable LOS in the project vicinity, SCCCD shall participate in the following improvements: a. At the intersection of Blackstone Avenue and Cambridge Avenue, prior to operation of the project: Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue. Additionally, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. b. At the intersection of Blackstone Avenue and University Avenue, prior to operation of the project: Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue. c. At the intersection of Blackstone Avenue and Weldon Avenue, prior to operation of the project: Add a southbound U-turn-turn lane; remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and modify the traffic signal to accommodate the added lane.

	d. At the intersection of Glenn Avenue and Clinton Avenue, prior to the occurrence of Cumulative Year 2035 Traffic Conditions: Modify the northbound left-right lane to a left-turn lane; add a northbound right-turn lane; and eliminate curbside parking along Glenn Avenue within the limits of the proposed right-turn lane and transitions thereof. Refer to the Queuing Analysis for the storage capacity recommended for this movement. **T-2:** SCCCD shall be responsible for contributing its proportionate share of the installation of improvements at the intersections identified in Table 6.17-B, Project Fair Share of Future Roadway Improvements. Fair share contributions shall only be made for those facilities, or portion thereof, currently not funded by the responsible agencies roadway impact fee program(s) or grant funded projects, as appropriate. It is recommended that SCCCD work with the City of Fresno to develop the estimated construction cost. **T-3:** SCCCD shall work with the City of Fresno to review and implement the recommended left-turn and right-turn lane storage lengths as indicated in the Queuing Analysis. **T-4:** The project shall implement Class I Bike Routes along the following areas: Glenn Avenue within the project site, along the project's frontage to Cambridge Avenue (between San Pablo Avenue and Blackstone Avenue), and Weldon Avenue within the project site. **T-5:** The project shall retain existing walkways that are in a good state and compliant with requirements of the Americans With Disabilities Act (ADA) along its frontages to San Pablo Avenue, Blackstone Avenue, Cambridge Avenue, and Weldon Avenue, SCCCD shall act to ensure that any gaps be filled and that the project reconstruct walkways where needed to conform to current California Building Code and ADA requirements. **T-6:** To help facilitate transit usage at the project, SCCCD shall coordinate with FAX to improve headways of the existing transit routes serving the FCC campus, and landscape design for the project shall take into consideration measures such as tree plantings which may provide shade and help reduce heat at transit stops during the summer months.
Tribal Cultural Resources	**Tribal Cultural Resources: Mitigation for Potential Discovery of Subsurface Resources** **TC-1:** If tribal cultural resources are discovered during construction activities, construction shall stop in the immediate vicinity of the find and a qualified professional with expertise in tribal cultural resources shall be consulted to recommend an appropriate course of action with the input of potentially affected tribes. If it is determined by the Lead Agency that the project may cause a substantial adverse change to a tribal cultural resource, mitigation measures to be considered should include those identified in Public Resources Code Section 21084.3.

1. Introduction

1.1. Purpose and Scope of Environmental Review

State Center Community College District (SCCCD) is proposing to undertake development of the Fresno City College Parking and Facilities Expansion Project (project). This Initial Study is an informational document that will inform SCCCD and the public generally of the significant environmental effects of the project and identify possible ways to minimize the significant effects. It focuses primarily on the changes in the environment that would result from the project and examines all phases of the project including planning, construction, and operation. Under CEQA and the CEQA Guidelines, "significant effect or impact" means "a substantial, or potentially substantial adverse change in any of the physical conditions within the area affected by the project, including but not limited to land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."

To promote efficiency and reduce redundancy, the Initial Study incorporates by reference information from other documents and sources that is germane to the proposed project and is available for public review. Most of the information incorporated by reference is from the City of Fresno General Plan Master EIR, which provides a comprehensive evaluation of impacts associated with implementation of the City of Fresno's most recently adopted General Plan (i.e. the *2014 Fresno General Plan*).

1.2 Public Review Process

The public review process for this Initial Study includes the following:

- SCCCD sent a Notice of Preparation (NOP) for the project to all responsible, trustee, and interested agencies for the project[1]. The NOP was also sent to nearby property owners and residents and was filed with the Fresno County Clerk's office for a period of 30 days. The NOP included a summary description of the project, its location, and potential environmental effects. The purpose of the NOP was to solicit guidance from the agencies as to the scope and content of the environmental information that should be included in the project's evaluation of environmental impacts, and to allow nearby property owners and residents to provide environmental comments on the project for the District's consideration in preparing the report.
- A community meeting was held at Fresno City College on May 22, 2019, during which staff from SCCCD (both the District Office and FCC) and Odell Planning & Research presented details of the project and its environmental review process to attendees. Attendees had the opportunity to ask questions and comment on the project and the environmental review process.
- SCCCD has distributed a Notice of Intent to Adopt a Mitigated Negative Declaration (NOI) for the project. The notice states that the District has prepared an Initial Study and proposed Mitigated Negative Declaration for the project, includes a brief description of the project and its location, an address where copies of the Initial Study are available for public review, and the beginning and end dates for a 30-day review period during which the District will receive public comments on the Initial Study. SCCCD sent the NOI to the California Office of Planning and Research's State Clearinghouse and all responsible, trustee and interested agencies; posted the notice at the Fresno County Clerk's Office and in a newspaper of general circulation in the area affected by the project; mailed the notice to all individuals and organizations who previously requested the notice in writing; and mailed the notice to nearby owners and residents.
- Following completion of the 30-day public review period for the Mitigated Negative Declaration, the SCCCD Board of Trustees will meet to consider adoption of a Mitigated Negative Declaration and approval of the

[1] While a NOP was initially distributed in anticipation that the project would require preparation of an EIR, the review and analysis completed as part of the environmental review process determined there were no significant impacts associated with the project which could not be mitigated to a less than significant level, thus a Mitigated Negative Declaration has been recommended rather than an EIR.

project. Comments and recommendations received on the Initial Study from agencies and individuals; a list of persons, organizations, and public agencies who have commented on the Initial Study; and the responses of the District to significant environmental points raised in the review and consultation process will be provided to the Board. Additionally, individuals and agency representatives may appear in person to present testimony to the District on the Mitigated Negative Declaration and the project when the Board of Trustees meets to consider adopting the Mitigated Negative Declaration and approving the project.

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2. Project Background Information

2.1 Project Title, Lead Agency, and Lead Agency Contact Information

Project Title: Fresno City College Parking and Facilities Expansion Project

Lead Agency and Project Sponsor:

State Center Community College District
1171 Fulton Street
Fresno, CA 93721

Lead Agency Contact Person:

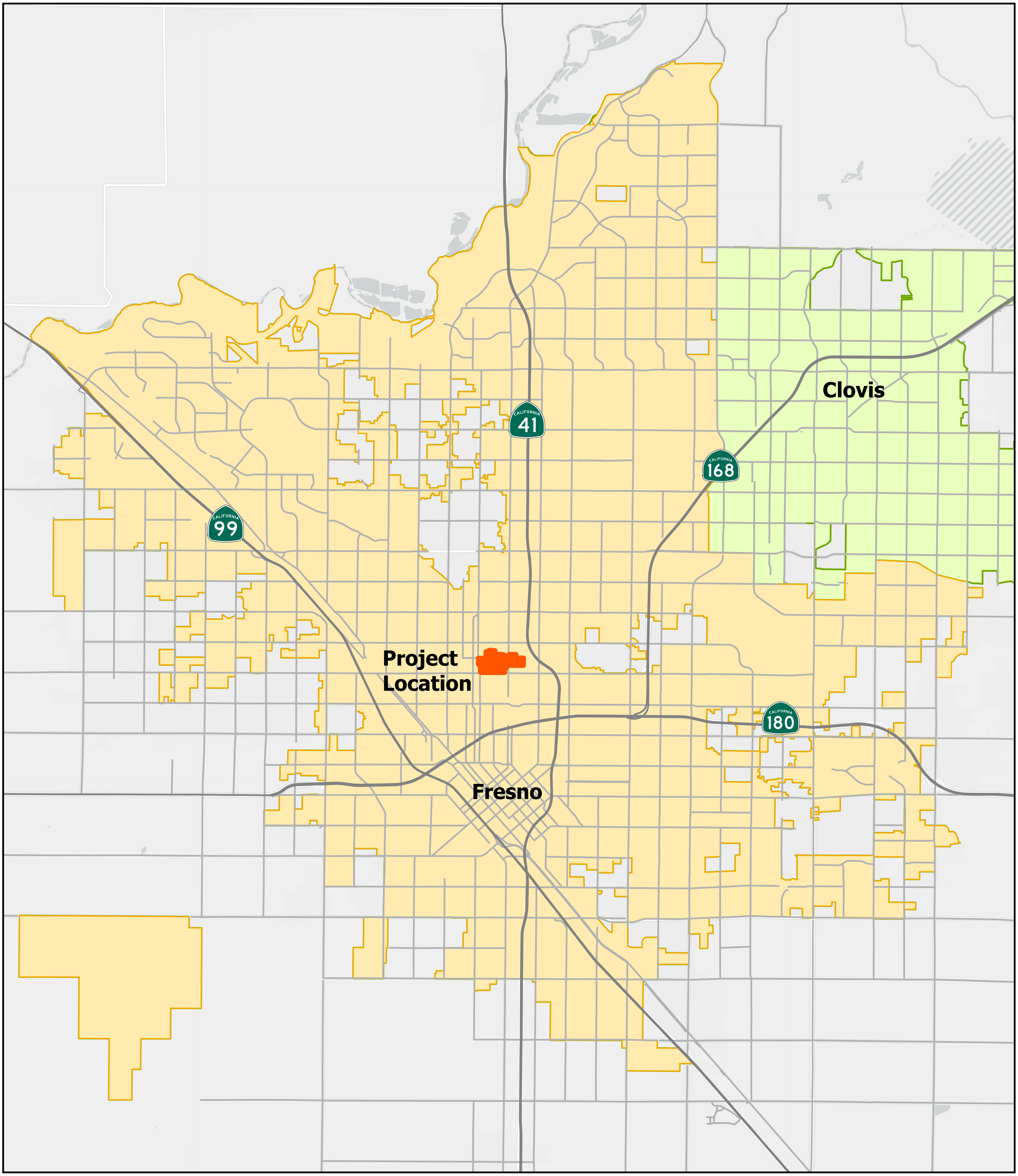
George Cummings
District Director of Facilities Planning
Telephone: (559) 243-7191
Email: george.cummings@scccd.edu

2.2 Project Location

The project site is generally located on the west side of Blackstone Avenue between Cambridge Avenue and University Avenue in the City of Fresno. The site encompasses approximately 11.0 acres of land in the northeast portion of the existing FCC campus plus seven additional parcels (2.16 acres) located adjacent to the existing FCC campus boundaries. Figure 2-1 shows the regional location of the project site in relation to the cities of Fresno and Clovis. Figure 2-2 provides an aerial view of the project location and identifies the existing FCC campus boundaries, the adjacent properties proposed to be added to the campus, and the proposed locations of the facilities that would be added as part of the project. As shown on Figure 2-2, the project site is generally bordered by existing FCC campus facilities to the south and west, residential development to the north and northwest, and commercial development to the east along Blackstone Avenue.

Table 2.2-A
Project Location

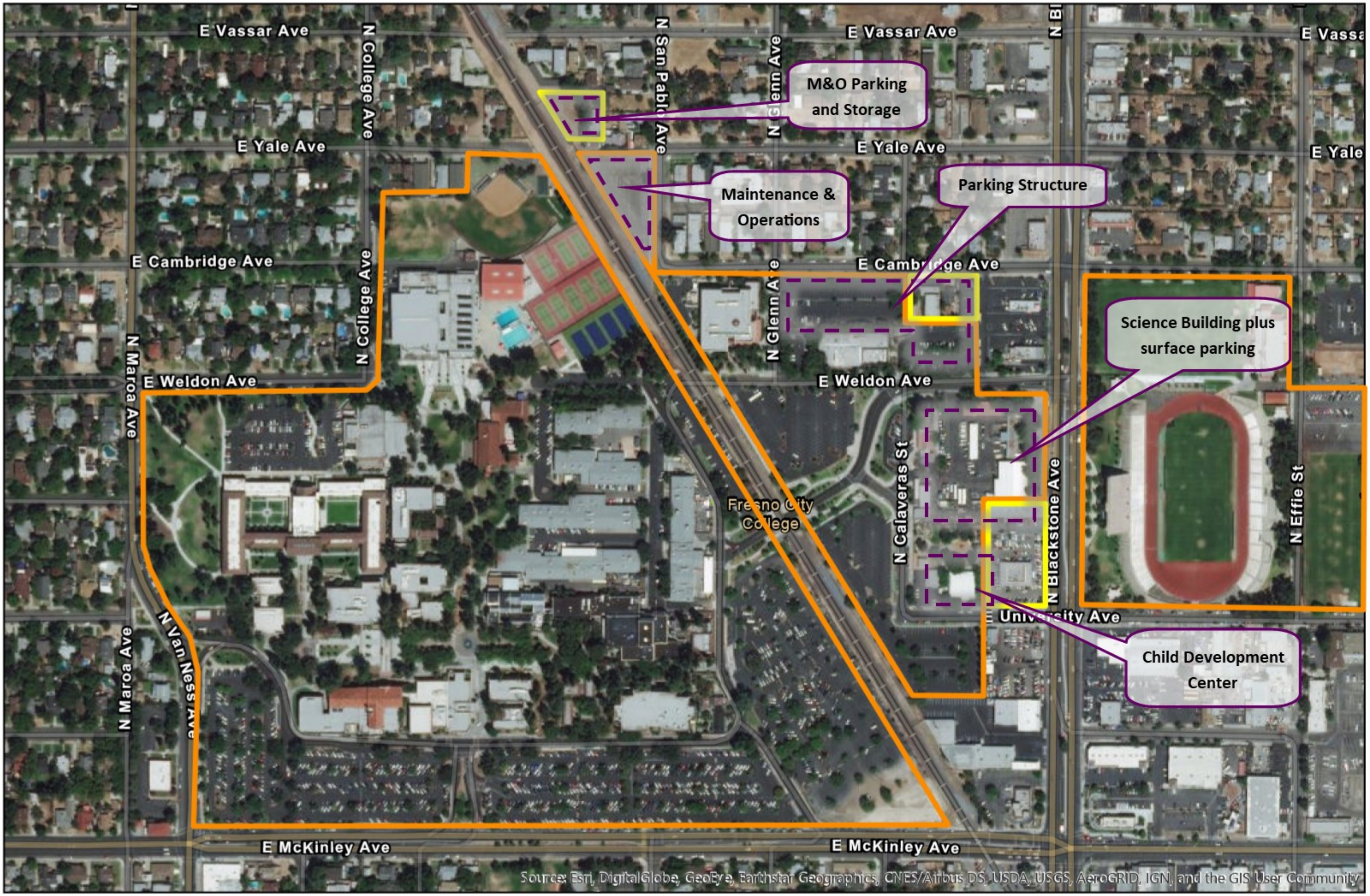
City, County, and State	Fresno, Fresno County, California
Adjacent Major Cross Streets	N. Blackstone Avenue and E. Weldon Avenue
Site Area	11.0 acres (includes a portion of the existing campus plus 7 adjacent parcels)
USGS Map	Fresno North, California Quadrangle 7.5 Minute Series
Latitude & Longitude	36°46'06"N; 119°47'30"W
Section, Township, and Range	Section 28, Township 13 South, Range 20 East, MDB&M
Elevation	305 feet above mean sea level



Regional Location **Figure 1**

Fresno City College Parking and Facilities Expansion Project
State Center Community College District

ODELL Planning & Research, Inc.
Environmental Planning • School Facility Planning • Demographics



Project Site **Figure 2**

Fresno City College Parking and Facilities Expansion Project
State Center Community College District

ODELL Planning & Research, Inc.
Environmental Planning • School Facility Planning • Demographics

2.3 Project Description

State Center Community College District is proposing to develop new parking, educational and administrative facilities at Fresno City College. The proposed facilities would be located partially within the boundaries of the existing campus and partially on neighboring parcels. Following are the major design, construction, and operational characteristics of the proposed project:

- Construction of a four-story parking structure on the south side of Cambridge Avenue west of Blackstone Avenue located north of the former District Office building. The proposed parking structure would have capacity for up to 1,000 parking spaces with five levels of parking (ground to roof). Ingress/egress points for the parking structure are to be located at its south side (connecting to Weldon Avenue), west side (connecting to a campus driveway aligning with Glenn Avenue), and north side (connecting to Cambridge Avenue).
- Construction of a three-story Science Building (approximately 95,000 square feet) located near the southwest corner of Blackstone and Weldon Avenues. The new Science Building is proposed to include six biology labs, three anatomy and physiology labs, five chemistry labs, two physics labs, two engineering labs, a computer lab, three general educational classrooms, four Design Science (Middle College) classrooms, welcome center, tutorial space, and 34 faculty offices. Surface parking would also be added adjacent to the building. Existing Maintenance & Operations facilities located in this area would be removed and relocated as indicated in the fourth bullet below.
- Replacement of the existing one-story, 5,255 square-foot Child Development Center with a new two-story, 16,480 square-foot Child Development Center at its current location.
- Construction of a one-story, 10,000 square-foot Maintenance & Operations Building plus a parking and storage area on the west side of San Pablo Avenue northwest of the existing Health Sciences Building. Fencing would be included at both the Maintenance & Operations Building and the parking and storage area.
- Repurposing of the former District Office building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department and District administrative functions.

The proposed expansion area includes seven parcels adjacent to the north and east of the existing FCC campus, totaling approximately 2.18 acres. The additions to the campus land area to accommodate the project are described in more detail below and shown on Figure 2:

- Two parcels (1.20 acres total) on the west side of Blackstone Avenue between Weldon Avenue and University Avenue; planned as space for future educational facilities.
- Three parcels (0.63 acres total) on the south side of Cambridge Avenue between Blackstone Avenue and Calaveras Street; planned as space for a portion of the parking structure.
- Two parcels (0.35 acres total) on the north side of Yale Avenue between San Pablo Avenue and the BNSF railroad tracks; planned as parking and storage space for Maintenance & Operations.

If approved, the project is expected to be developed and operational during the next five years.

2.4 Project Setting

a. Existing Land Uses

The project site includes a portion of the existing Fresno City College campus along with land immediately adjacent to the campus. The existing Fresno City College campus covers an area of 103 acres ranging from Van Ness Avenue to the west, Clark Street to the east, McKinley Avenue to the south, and Yale Avenue to the north. However, most of the existing campus facilities (particularly its academic instructional facilities) are concentrated west of Blackstone Avenue. Campus facilities east of Blackstone Avenue include several athletic facilities (e.g. Ratcliffe Stadium, Euless Park, physical education facilities), the Police Academy, and surface parking areas. See Figure 2 for a diagram of the project site boundaries.

Existing development located on the project site is as follows:

- The existing campus portion of the project site currently includes surface parking areas, the existing Child Development Center, the former SCCCD District Office building, and two one-story office buildings plus storage areas used by SCCCD's Police Department and Maintenance & Operations department.
- The two parcels located on the west side of Blackstone Avenue are currently developed with commercial uses. One parcel contains a used auto dealership, and the other parcel contains a single-story commercial building occupied by an auto repair facility, smog facility, and hair salon.
- The three parcels located on the south side of Cambridge Avenue are partially developed with residential uses. Two of the residential structures have been demolished.
- One of the two parcels located north of Yale Avenue is developed with an unoccupied duplex, while the other parcel is vacant.

Fresno City College is located amidst an established urbanized area near the center of the City of Fresno. The campus is situated among primarily residential areas located to the west, north, and south of the campus and commercial and industrial areas located to the east of the campus along Blackstone Avenue (see Figure 2).

The area to the north of Cambridge Avenue between the BNSF railroad tracks and the commercial properties along Blackstone Avenue is developed with a mixture of single-family and multifamily residential uses. The Fresno General Plan designates this area as Medium High Density Residential.

Development along Blackstone Avenue in the vicinity of the project site includes Ratcliffe Stadium, fast food restaurants, auto dealerships, auto repair shops, and other commercial uses. The Fresno General Plan designates all parcels with frontage along Blackstone Avenue in the vicinity of the project site, other than the FCC campus itself, as Neighborhood Mixed Use. The area further east of Blackstone Avenue includes a mixture of commercial and industrial uses, single-family residences, and State Route 41.

The western boundary of the project site is formed by the BNSF railroad tracks, which bisect the Fresno City College campus. The area to the west of the site across the railroad tracks is occupied by existing FCC campus facilities. Between Weldon Avenue and McKinley Avenue is the main portion of the campus, which includes several academic buildings, administrative buildings, library, cafeteria, theater/auditorium, green space, and parking areas. Between Yale Avenue and Weldon Avenue is FCC's gymnasium, softball complex, swimming pools, and tennis courts. Further west and northwest are areas of primarily single-family residential development, including the historic Porter Tract.

b. Public Land Use Policy

City of Fresno

City of Fresno 2014 General Plan

The *2014 Fresno General Plan* provides adopted public land use policy for the City of Fresno. The General Plan's Land Use and Circulation Map shows the project site contains land designated as Public Facilities – College, Neighborhood Mixed Use, and Medium High Density Residential.

The Public Facilities designation denotes the sites of existing and planned public facilities within the City of Fresno, such as City Hall, county buildings, schools, colleges, the municipal airports, and hospitals. It also includes public facilities, such as fire and police stations, City-operated recycling centers, sewage treatment plants, neighborhood, community and regional parks, recreational centers, golf courses, and multi-purpose trails that serve both regional and neighborhood needs.

The General Plan describes the Neighborhood Mixed Use designation as providing for "mixed-use districts of local-serving, pedestrian-oriented commercial development, such as convenience shopping and professional offices in two- to three-story buildings." Additional detail is provided as follows:

> *Development is expected to include ground-floor neighborhood retail uses and upper-level housing or offices, with a mix of small lot single family houses, townhomes, and multi-family dwelling units on side streets, in a horizontal or vertical mixed-use orientation. The built form will have a scale and character that is consistent with pedestrian-orientation, to attract and promote a walk-in clientele, with small lots and frequent roadway and pedestrian connections permitting convenient access from residences to commercial space. Automobile-oriented uses are not permitted.* (Fresno General Plan, p. 3-41)

The Medium High Density Residential use is described in the General Plan as "intended for neighborhoods with a mix of single-family residences, townhomes, garden apartments, and multi-family units intended to support a fine-grain, pedestrian scale. This land use accommodates densities from 12 to 16 units per acre overall."

The *Fresno General Plan* puts forth goals related to Urban Form, Land Use, and Design which focus on "establishing a structural framework for the city, enhancing the character of neighborhoods and districts, creating vibrant centers of activity and a public realm that is engaging and livable, crafting a tapestry of distinctive, connected communities, and strengthening Fresno's identity and sense of place." These goals include the following:

- Increase opportunity, economic development, business and job creation.
- Support a successful and competitive Downtown.
- Emphasize conservation, successful adaptation to climate and changing resource conditions, and performance effectiveness in the use of energy, water, land, buildings, natural resources, and fiscal resources required for the long-term sustainability of Fresno.
- Emphasize achieving healthy air quality and reduced greenhouse gas emissions.
- Provide for a diversity of districts, neighborhoods, housing types (including affordable housing), residential densities, job opportunities, recreation, open space, and educational venues that appeal to a broad range of people throughout the City.
- Develop Complete Neighborhoods and districts with an efficient and diverse mix of residential densities, building types, and affordability which are designed to be healthy, attractive, and centered by schools, parks, and public and commercial services to provide a sense of place and that provide as many services as possible within walking distance.
- Promote a city of healthy communities and improve quality of life in established neighborhoods.
- Emphasize increased land use intensity and mixed-use development at densities supportive of greater use of transit in Fresno.
- Improve Fresno's visual image and enhance its form and function through urban design strategies and effective maintenance.
- Recognize, respect, and plan for Fresno's cultural, social, and ethnic diversity, and foster an informed and engaged citizenry.

Additionally, the General Plan devotes specific attention to the Blackstone Avenue Corridor, which includes the location of the FCC campus and the project site. Blackstone Avenue is identified as being "currently the most prominent major street corridor connecting the Downtown area to the northern areas of Fresno," and it is noted for its significance in the implementation of Fresno's Bus Rapid Transit (BRT) route. The General Plan envisions a new focus on land use and design along major streets and in neighborhoods that support Downtown, including proposals for increased density and vibrant mixed-use centers that will emanate from the Downtown area along major transportation corridors, particularly Blackstone Avenue. Seen as having many "opportunity sites" that may be developed into Activity Centers in the future, Blackstone Avenue is eventually planned to have major BRT stations and surrounding mixed-use centers at one-mile intervals located at the intersections of major east-west avenues such as Bullard, Shaw, Ashlan, Shields, and McKinley. Ultimately, the BRT stations will be the focus of mixed-use development that is pedestrian-oriented and closely ties the stations with the surrounding neighborhood.

Tower District Specific Plan

Adopted in 1991, the Tower District Specific Plan encompasses an older “streetcar suburb” area within the City of Fresno and was created partially in response to major upheaval occurring from the construction of the CA-180 freeway plus incremental development activity that presented conflicts with the established character and identity of the area. The stated purpose of the Tower District Specific Plan “to provide the City and the residents of the district with a comprehensive structure for managing historic resources and neighborhoods in the face of future change and development. The Plan is intended to address urban conservation and new development, with a framework of goals and policies for neighborhood quality and stability, for economic development and reinvestment, and for fiscal responsibility.” The Specific Plan includes several objectives and policies reflected in the current Fresno General Plan, such as encouragement of pedestrian- and transit-oriented development and emphasizing urban form factors (including implementation of the Tower District Design Guidelines). Particularly relevant to the subject project is a policy to “Discourage spill-over parking from large institutions into residential neighborhoods [and] encourage the State Center Community College District to develop and implement a Master Parking Plan for Fresno City College” (see Goal III, Objective 2, Policy 4 of the Tower District Specific Plan).

Zoning – Citywide Development Code

The City of Fresno’s Citywide Development Code implements the City’s General Plan (plus other operative plans) to protect and promote the public health, safety, peace, comfort, convenience, prosperity, and general welfare of the City of Fresno. The Development Code describes itself as intended to achieve the following, consistent with the goals, objectives, and policies of the General Plan and any other operative plan:

- To provide a precise guide for the physical development of the city in a manner as to progressively achieve the arrangement of land uses depicted in the General Plan.
- To foster a harmonious and workable relationship among land uses and ensure compatible infill development.
- To support economic development and job creation.
- To provide for the housing needs of all economic segments of the community.
- To promote high quality architecture and sustainable design (i.e., a philosophy that seeks to maximize the quality of the built environment, while minimizing or eliminating negative impact to the natural environment).
- To promote the stability of existing land uses that conform to the General Plan, protecting them from inharmonious influences and harmful intrusions.
- To promote a safe and efficient traffic circulation system, including bicycle facilities and pedestrian amenities, and to support a multi-modal transportation system.
- To facilitate the appropriate location of community facilities, institutions, parks, and recreational areas.
- To protect and enhance real property values.
- To safeguard and enhance the appearance of the city.
- To define duties and powers of governing bodies and officials responsible for the implementation of this Code.

The Development Code defines and identifies zoning districts within the City of Fresno. Zoning designations for the properties encompassed within the project site include "PI" (Public and Institutional), "NMX" (Neighborhood Mixed Use), and "RM-1" (Residential Multi-Family, Medium High Density).

The majority of the project site is zoned PI, reflective of its location within the existing FCC campus boundaries. The PI zone The PI district is used for public or quasi-public facilities, including City facilities, utilities, schools, health services, corporation yards, utility stations, and similar uses. Accessory retail uses and services, including food facilities and childcare, are also permitted in the PI district.

Five of the parcels adjacent to the existing campus (1.81 acres, most of the expansion area) are zoned NMX. The NMX zone is described in the Development Code as "provid[ing] for a scale and character of development that is pedestrian orientated, designed to attract and promote a walk-in clientele, with small lots and frequent pedestrian connections permitting convenient access from residences to commercial space." Development is expected to include ground-floor neighborhood retail uses and upper-level housing or offices, with a mix of small lot single-family houses, townhomes, and multi-family dwelling units on side streets, in a horizontal or vertical mixed-use orientation. Day Care Centers are included as a permitted use in the NMX zone district, as are Government Offices (not allowed on the ground floor of portions of the site which abut a major street, but allowed in the interior of all sites) and Business and Professional Offices.

Two parcels proposed as the Maintenance & Operations Building parking area (totaling 0.35 acres) are zoned RM-1. Areas zoned "RM" are generally intended to provide for a variety of multi-family residence types and housing opportunities, with additional emphasis on preserving, protecting, and enhancing the City's medium and high-density neighborhoods; promoting development of walkable, transit-oriented neighborhoods; ensuring compatibility of scale, mass, and form with existing structures; and ensuring adequate provisions of services and facilities. While the RM-1 zone is used primarily to provide for medium-high density residential development, it also allows some non-residential uses (either permissibly or conditionally), including but not limited to, Colleges and Trade Schools, Public Safety Facilities, Corner Commercial, and Personal (Mini) Storage.

Table 2.4-A presents a summary of the existing land uses, City of Fresno General Plan Land Use designations, and City of Fresno Zoning designations for each of the parcels included in the project site.

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TABLE 2.4-A
Existing Land Uses, General Plan Designations, and Zoning

Fresno County Assessor Parcel Number	Parcel Size (Acres)	Existing Land Uses	Fresno General Plan Land Use Designation	City of Fresno Zoning
444-086-11	0.14	Vacant	Residential, Medium High Density	RM-1
444-086-14	0.21	Residential, Duplex	Residential, Medium High Density	RM-1
444-165-12T	0.65	FCC Campus	Residential, Medium High Density	RM-1
444-176-05T	1.75	FCC Campus	Residential, Medium High Density	RM-1
444-176-06T	3.15	FCC Campus	Public Facilities/College	PI
444-176-07	0.31	Vacant	Neighborhood Mixed Use	NMX
444-176-08	0.15	Vacant	Neighborhood Mixed Use	NMX
444-176-09	0.15	Residential, Duplex	Neighborhood Mixed Use	NMX
444-235-19T	0.16	FCC Campus	Public Facilities/College	PI
444-235-20T	0.17	FCC Campus	Public Facilities/College	PI
444-235-21T	0.19	FCC Campus	Public Facilities/College	PI
444-235-22T	0.19	FCC Campus	Public Facilities/College	PI
444-235-23T	0.19	FCC Campus	Public Facilities/College	PI
444-235-24T	0.31	FCC Campus	Public Facilities/College	PI
444-235-25T	0.80	FCC Campus	Public Facilities/College	PI
444-235-26T	2.57	FCC Campus	Public Facilities/College	PI
444-235-27T	2.91	FCC Campus	Public Facilities/College	PI
444-235-28T	0.08	FCC Campus	Public Facilities/College	PI
444-235-29T	0.05	FCC Campus	Public Facilities/College	PI
444-235-30T	0.23	FCC Campus	Public Facilities/College	PI
444-235-31	0.40	Commercial, Auto Repair and Misc Retail/Service	Neighborhood Mixed Use	NMX
444-235-32T	0.23	FCC Campus	Public Facilities/College	PI
444-235-33T	0.23	FCC Campus	Public Facilities/College	PI
444-235-34T	0.46	FCC Campus	Public Facilities/College	PI
444-235-36	0.80	Commercial, Auto Sales	Neighborhood Mixed Use	NMX

Sources: Fresno County Assessor's Office, City of Fresno General Plan, City of Fresno Development Code, Odell Planning & Research, Inc., Google satellite imagery

State Center Community College District

Community College District Land Use Powers and Authority

A community college district is afforded unique discretion when developing educational facilities. In addition to being able to act as its own lead agency, a community college district may take action pursuant to provisions of the California Government Code when developing a project to act independently from land use regulations of the City or County in which the project is located. Government Code Section 65402(c) allows a community college district to overrule findings of a City or County regarding the General Plan conformity of a proposed project. Government Code Section 53094 allows a community college district to exempt a proposed project from the zoning ordinances of the City or County. However, subdivision (b) of Section 53094 limits the availability of the zoning override as follows: "The governing board of the school district may not take this action when the proposed use of the property by the school district is for nonclassroom facilities, including, but not limited to, warehouses, administrative buildings, and automotive storage and repair buildings."

SCCCD Facilities Master Plan

SCCCD's Facilities Master Plan provides a guide for future development at each of the eight campuses within the District. It provides a blueprint for the potential placement of future facilities, removal and/or renovation of existing facilities, and various site improvements throughout the District. The plan includes conceptual drawings and schematic layouts that identify the location and purpose of improvements, with final designs for sites and projects occurring as projects are funded and detailed programming and design occur.

Fresno City College Educational Master Plan 2016-2026

The Fresno City College Educational Master Plan is a long-term comprehensive plan for educational programs and services. While the Educational Master Plan is less specifically focused on facilities development than the Facilities Master Plan, the two plans are integrated with one another, and the FCC Educational Master Plan mentions the necessity of well-designed and well-kept facilities in providing quality services to students and creating a cohesive and supportive environment for its administrators, faculty, staff and students.

Following are excerpts from the FCC Educational Master Plan which address and relate to components of the proposed project:

- *Classroom Space for Math, Science, and Engineering (MSE)*: The hard sciences (MSE division) are limited to the number of lab stations available and must also consider safety concerns, although with the advent of the new MSE facility, lab availability will be addressed. (FCC Educational Master Plan, p. 36)
- *Child Development Center*: During 2014 campus and community discussions, the decision was made to leave the Child Development Center in its current location and not relocate it across Blackstone Avenue to the current Police Academy location. This will allow safe access to the campus and center services for children and their FCC student parents. The current facilities do not meet the needs of students who are observing at the center. Additionally, Child Development faculty members are spread across the campus due to lack of faculty space near the center. (FCC Educational Master Plan, p. 56)
- *Parking*: Current enrollment at Fresno City College is over 21,506 with about 1,000 full-time and part-time employees. The number of available parking stalls is 2,976; therefore, the number of available parking stalls is 0.132 stalls per student/employee. This ratio does not account for restricted stalls (i.e. ADA, staff and motorcycle), which most students are not able to utilize. Research has found the ideal parking ratio for a community college campus is 0.18 stalls per school population (representing 536 additional parking stalls for FCC if student population is kept the same). School population includes students, faculty and employees. Research has also determined the parking capacity at FCC is currently below the ideal supply. Lack of convenient parking and inefficient traffic patterns present significant impediments to student access and success caused by frustration in finding parking and arriving late to classes. To sustain enrollment growth, FCC has to further increase parking capacity. (FCC Educational Master Plan, p. 54)

- *Landlocked*: As the residential neighborhoods and commercial districts surrounding the campus developed and matured, the campus has become landlocked and expansion opportunities are limited. Over time, multi-family residential properties to the north of the campus have been acquired by State Center Community College District to facilitate campus expansion. FCC is now considered an inner-city/urban campus and, as such, expanding into undeveloped land is no longer an option. With no additional land area on which to build new buildings or additional parking, alternative development patterns must be considered if the campus population is to grow. To meet the needs of projected future growth of the campus, the Master Plan proposes to densify the campus by identifying single story structures in the academic core and either removing or replacing them with multi-story buildings. (FCC Educational Master Plan, p. 54)

In addition to descriptions of existing campus conditions and needs, the Educational Master Plan includes a section titled Recommendations For College Long-Term Goals, which presents the following objectives that are notably related to the proposed project:

- Objective 1.4: FCC will implement the SCCCD Facilities Master Plan that calls for addressing traffic flow and additional parking, modernization of the MSE building and a Student Center on the FCC campus.
- Objective 1.5: FCC will address additional facilities needs as identified in the SCCCD Facilities Master Plan such as Child Development Center, ADA compliance issues, technology upgrades, and athletic facilities.
- Objective 1.6: FCC will implement the Measure C projects. (Note: Measure C refers to a bond measure approved for SCCCD, which includes funding for components of the subject project)

2.5 Actions Required to Implement the Project

State Center Community College District must undertake the following actions in order to implement the project:

- Complete the California Environmental Quality Act process for the project. This would involve either the adoption of a mitigated negative declaration for the project or the preparation of an environmental impact report. Based on the results of this Initial Study, the District should consider the adoption of a mitigated negative declaration for the project;
- Adopt and implement the Mitigation Monitoring and Reporting Program identified in Part F of this Initial Study;
- Approve the project;
- Secure approvals, permits, and agreements, as necessary, from agencies and utilities that are responsible for public facilities the project would construct, modify, or otherwise affect within or near the site.

2.6 Other Public Agencies Whose Approval is Required

Implementation of the project would require approvals from the following Responsible Agencies:

- The City of Fresno must review and approve plans and accept improvements related to the provision of public street access, water supply, sewage collection, and fire protection improvements for the campus.
- The Fresno Metropolitan Flood Control District (FMFCD) must review and approve any plans for storm drainage improvements or modifications.
- The San Joaquin Valley Air Pollution Control District must review and approve the project for compliance with Rule 9510 (Indirect Source Review) and other applicable rules and regulations.

The California Department of Fish and Wildlife is the only Trustee Agency identified for the project. The agency has jurisdiction over biological resources the project may impact.

3. Environmental Factors Potentially Affected

Based on the evaluations in Part E, the project would have a less than significant impact on the environmental factors listed in the following table. Those factors that require mitigation to be incorporated into the project to be less than significant are noted with an "X".

TABLE 3-A
Environmental Factors Potentially Affected

Aesthetics	×	Agricultural and Forestry Resources		Air Quality	×
Biological Resources	×	Cultural Resources	×	Energy	×
Geology and Soils	×	Greenhouse Gas Emissions		Hazards and Hazardous Materials	
Hydrology and Water Quality	×	Land Use and Planning		Mineral Resources	
Noise	×	Population and Housing		Public Services	
Recreation		Transportation	×	Tribal Cultural Resources	×
Utilities and Service Systems	×	Wildfire		Mandatory Findings of Significance	×

4. Determination

Based on this Initial Study, State Center Community College District hereby determines that the Fresno City College Parking and Facilities Expansion Project could have significant effects on the environment, but mitigation measures incorporated in the project by the District will avoid or reduce the effects to less than significant. Therefore, a Mitigated Negative Declaration will be prepared.

October 3, 2019

Signature | Date

CHRISTINE MIKTARIAN | VICE CHANCELLOR OPERATIONS & IS

Printed Name | Title

5. Approach to Evaluation of Environmental Impacts

5.1 State CEQA Guidelines Appendix G and Thresholds of Significance

This Initial Study identifies and analyzes the potential impacts of the project on the environmental resources and conditions listed in Appendix G in the State CEQA Guidelines[2], describes feasible mitigation measures that could be incorporated in the project to avoid the impacts or reduce them to an insignificant level, and determines the significance of the impacts without or with mitigation. The environmental resources and conditions listed in Appendix G are categorized as follows: Aesthetics, Agricultural and Forestry Resources, Air Quality, Biological Resources, Cultural Resources, Energy, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Noise, Population and Housing, Public Services, Recreation, Transportation, Tribal Cultural Resources, Utilities and Service Systems, Wildfire, and Mandatory Findings of Significance.

The discussion of each impact in Section 6 of the Initial Study concludes with a determination that the impact is potentially significant, less than significant with mitigation, less than significant, or does not involve any impact (no impact).

The "potentially significant" determination is applied if there is substantial evidence that an effect may be significant. Under the State CEQA Guidelines, a significant effect, or impact, on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance (see Guidelines § 15382). The District must prepare an Environmental Impact Report for the project if the Initial Study identifies one or more potentially significant impacts that cannot be mitigated to a less than significant level.

The "less than significant impact with mitigation incorporated" determination applies when the incorporation by the District of mitigation measures in the project would reduce an impact from potentially significant to less than significant. This Initial Study describes each mitigation measure the District has incorporated in the project to reduce potentially significant impacts to a less than significant level.

The "less than significant" determination applies when the project would not result in a significant effect on a resource or condition. The less than significant determination used only in cases where no mitigation measures are required to reduce an impact to a less than significant level.

The "no impact" determination applies when the project would have no impact on a resource or condition or the resource or condition does not apply to the project or its location. The no impact determination is used only in cases where no mitigation measures are required to avoid or eliminate an impact.

The discussion of impacts in this Initial Study lists each potential impact as stated in Appendix G, provides an analysis of the impact, describes each mitigation measure required to avoid the impact or reduce it to an insignificant level, and concludes with a determination of the level of significance of the impact. References to documents that would provide background information on an impact are provided where applicable.

This Initial Study incorporates by reference all documents and other sources of information cited in the Evaluation of Environmental Impacts (Section 6) and Sources Consulted.

5.2 Existing Laws, Regulations, Policies, and Mitigation Measures

In some cases, an impact that might appear to be significant is less than significant because it is subject to state, regional, or local laws, regulations, or policies – the application of which will reduce the impact to a less than significant level. Preparation of this Initial Study included a review of applicable laws, regulations, and policies to

[2] This report uses the recently updated version of the Appendix G Checklist, which went into effect on December 28, 2018. A copy of the Appendix G Checklist can be viewed at: http://resources.ca.gov/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf

determine if they would prevent or reduce the potentially significant impacts of the proposed project. The Initial Study does not cite the laws, regulations, and policies as mitigation measures because they would apply to the project regardless of the outcome of the Initial Study.

For the proposed project, applicable laws, regulations, and policies include but are not limited to the following:

City of Fresno

- City of Fresno General Plan
- City of Fresno Citywide Development Code
- Standard Construction Drawings

Fresno County Department of Public Health, Environmental Health Division
https://www.co.fresno.ca.us/departments/public-health/environmental-health

The Environmental Health Division is responsible for performing a wide variety of public health services and enforcing numerous local and state regulations pertaining to public and environmental health. The HazMat Compliance Program is Fresno County's designated CUPA (Certified Unified Program Agency) and oversees six state-mandated programs in Fresno County: Hazardous Materials Business Plan (HMBP), California Accidental Release Program (CalARP), Underground Storage Tank Program (UST), Aboveground Storage Tank Program (APSA), Hazardous Waste Generator Program, and Tiered Permitting Program. Additionally, the Environmental Health Division is responsible for regulating and permitting retail food facilities (including college eating and dining facilities), reviewing construction plans and inspection of new and remodeled food facilities, investigating complaints regarding violations involving unsanitary conditions, investigates suspected food borne illnesses, etc.

Fresno Metropolitan Flood Control District (FMFCD)

FMFCD manages flood control facilities in the Fresno area, and projects to be served by FMFCD facilities are subject to compliance with plans and policies administered by FMFCD prior to implementation. SCCCD is subject to compliance with FMFCD requirements for the design, construction, and operation of on- and off-site stormwater improvements necessary to serve the project. Before beginning construction, SCCCD must prepare a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP is a site-specific plan that is designed to control the discharge of pollutants from the construction site to local storm drains and waterways. FMFCD is responsible to ensure Permit compliance within the boundaries of the area's National Pollutant Discharge Elimination System (NPDES) Permit boundary.

San Joaquin Valley Air Pollution Control District
https://www.valleyair.org/rules/1ruleslist.htm

Regulation VIII – Fugitive PM10 Prohibitions

Regulation IX – Mobile and Indirect Sources

5.3 Technical Studies

The analyses in this Initial Study of several resources and conditions are based on technical background studies in the areas of air quality, cultural resources, energy, greenhouse gas emissions, noise and vibration, and transportation/traffic. The studies are listed in the Table of Contents and Section 9 (Sources Consulted) and are presented as Appendices to this Initial Study.

6. Evaluation of Environmental Impacts

The following questions are taken from the State CEQA Guidelines, Appendix G: Environmental Checklist Form, Evaluation of Environmental Impacts (as updated December 28, 2018). The thresholds of significance used for this Initial Study are the same as the environmental issues listed in the Appendix G Checklist.

6.1 Aesthetics

During preparation of this Initial Study, multiple visits were made to the project site and its surrounding vicinity in order to effectively ascertain the aesthetic setting and potential effects of the project on the surrounding area. Pictures of the project site and its vicinity are included for reference as Appendix 1 of this Initial Study. The pictures focus on presenting the locations where the FCC campus would be expanded through development of the proposed project and the present conditions of these locations.

Except as provided in Public Resources Code § 21099, would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?			✓	
b. Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?				✓
c. In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			✓	
d. Create a new source of light and glare that would adversely affect day or nighttime views in the area?		✓		

Except as provided in Public Resources Code Section 21099, would the project:

a. Have a substantial adverse effect on a scenic vista?

The impact of the project on scenic resources would be less than significant. The City of Fresno General Plan Master EIR defines a scenic vista as a “viewpoint that provides a distant view of highly valued natural or man-made landscape features for the benefit of the general public” and discusses views of downtown Fresno, the San Joaquin River, and the Sierra Nevadas (General Plan MEIR, 2014). The project would not substantially adversely affect views of any of these identified scenic features due to its distance from these features and because its design characteristics (e.g. building height, size, and lighting) would be similar to development already existing at the FCC campus and in its vicinity.

b. Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

There are no state scenic highways or other scenic resources located in the project vicinity, thus no impact would result from the project.

c. In non-urbanized area, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

The project site is located both on and immediately adjacent to the existing Fresno City College campus, which is located in a highly urbanized area within the City of Fresno. Development projects in this location are generally subject to regulations and guidelines governing visual character, urban form, and scenic quality found in the City of Fresno's Citywide Development Code and in the Tower District Specific Plan. The applicable scenic regulations act as a means of regulating land development to achieve the desired urban form, thus the focus here is whether the project would be consistent with the urban form sought for the Blackstone Corridor and FCC vicinity.

As a whole, the expanded campus facilities proposed as part of the project are consistent with common visual elements in an urban setting as what exists and is planned for the project site and its vicinity. Residents in the area may consider the change in visual character an adverse impact. This change, however, is consistent with what the City of Fresno has planned for in the Blackstone Corridor area. For instance, the facilities proposed as part of the project would be located in a way that the most active, user-attracting uses (i.e. the Science Building and Child Development Center) are oriented near the frontage of Blackstone Avenue and the least active uses (i.e. Maintenance & Operations facilities) are oriented towards the interior of the existing campus and railroad-adjacent areas. Further, educational facilities are typically a common and congruent visual feature within mixed-use and residential areas, and the FCC campus is long-established as a feature within the project site vicinity. The proposed facilities would be visually compatible with existing and future planned development at the FCC campus.

The educational facilities included in the project (in this instance, the proposed Science Building and Child Development Center) would be sited on land zoned PI or partially NMX. The design characteristics are expected to be consistent with the applicable form-based regulations and achieve the desired urban aesthetic environment intended for these zone district, particularly in this vicinity.

The largest structure included as part of the project is the proposed parking structure. With five levels of parking including a ground-floor level, the parking structure could result in a form the equivalent of four stories in height. The NMX zone has a height maximum of 40 feet (Table 15-1103); above that, Development Code section 15-2012, Heights and Height Exceptions, allows for "Decorative features such as spires, bell towers, domes, cupolas, obelisks, clock towers, and monuments" to project up to 20 feet above the height limit on non-residential sites. The NMX zone additionally promulgates minimal setbacks (10 feet or less) and at least 60 percent frontage coverage. As a matter of urban form, the parking structure is capable of meeting these regulations.

The proposed Maintenance & Operations Building and parking area are located on areas zoned RM-1 by the City. Focusing specifically on form-based regulations in this district (e.g. height, lot coverage, setbacks), the proposed building would be designed to meet applicable requirements. The new proposed surface parking area, although extending further north, would be on a smaller footprint and have generally the same urban form characteristics (i.e. flat surface parking plus fencing, located on an irregular lot on a short dead-end roadway, immediately adjacent to railroad tracks).

For these reasons, the resulting visual character and quality of the project would be sufficiently consistent with the existing aesthetic setting and with the urban form envisioned in the City of Fresno's planning policies, and impacts of the project related to compatibility with applicable zoning and other regulations governing scenic quality would be less than significant.

d. Create a new source of light and glare that would adversely affect day or nighttime views in the area?

Under existing circumstances, the project vicinity is exposed to light and glare generated by existing activities and operations at the FCC campus as well as from commercial activity and transportation trips occurring along Blackstone Avenue. As part of the proposed project, buildings and parking areas will be lighted in pre-dawn and evening hours for the safety and security of the students and staff. Headlights from vehicles arriving and departing the campus during early morning and evening hours would also be a potential source of light and glare resulting from the project.

The anticipated project-related lighting and glare generally would not be unusual within the urban development that exists in the area surrounding the site. A substantial portion of the project, including the Science Building and the Child Development Center, is surrounded by existing campus and commercial uses which would not be adversely impacted by new lighting and glare. The project's primary potential for causing lighting and/or glare impacts relates to development of the proposed Parking Structure and Maintenance & Operations facilities. Development and operation of these facilities would place campus uses closer to existing residential properties located north of the project site, which could expose those properties to new and/or increased lighting and glare, such as from building lighting operated in the evening and from vehicle headlights entering and exiting the parking areas during pre-dawn and evening hours. It is worth noting that activity at the campus peaks between morning and early-afternoon hours (i.e. times during the day when lighting and glare sources are not in use), and design of the facilities is expected to include fixtures and equipment that function to keep lighting contained within the campus facilities. However, to ensure that adjacent existing and future land uses are not significantly impacted, the mitigation measures presented below will be incorporated into the project to reduce the generation of lighting and glare.

Mitigation Measure AE-1: Mitigation for Lighting and Glare

The following measures shall be incorporated into development and operation of the project in order to reduce impacts from lighting and glare:

a. All parking area lighting shall have full cut-off type fixtures. A full cut-off type fixture is a luminaire or lighting fixture that, by design of the housing, does not allow any light dispersion or direct glare to shine above a 90-degree horizontal plane from the base of the fixture. Full cut-off type fixtures must be installed in a horizontal position as designed.

b. All external signs and lighting shall be lit from the top and shine downward except where uplighting is required for safety or security purposes. The lighting shall also be, as much as physically possible, contained to the target area.

c. Exterior building lighting for security or aesthetics shall be full cut-off or a shielded type design to minimize any upward distribution of light.

d. No later than 10:00 p.m., lighting at project facilities not needed for safety or security purposes shall be turned off and the parking garage entrance/exit at Cambridge Avenue shall be closed. The Cambridge Avenue entrance/exit shall be equipped with gating or other equipment suitable for restricting access to the parking structure while also minimizing light and glare emitted from the interior of the parking structure.

Level of Significance After Mitigation: With implementation of the recommended mitigation measures for minimizing potential adverse lighting and glare, this impact will be less than significant.

6.2 Agricultural and Forestry Resources

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non- agricultural use?				✓
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
c. Conflict with existing zoning for, or cause rezoning of, forestland, timberland, or timberland zoned Timberland Production?				✓
d. Result in the loss of forestland or conversion of forestland to non-forest use?				✓
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forestland to non-forest use?				✓

Would the project:

a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non- agricultural use?

The project would have no impacts on agricultural or forestry resources. The project site is located in a completely urbanized area that does not include any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. No agricultural-zoned areas or properties under Williamson Act contract are located at the project site or in its vicinity. Additionally, there are no forestland or timberland areas within the City of Fresno city limits.

b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?

This impact is addressed in Section 6.2(a) above.

c. Conflict with existing zoning for, or cause rezoning of, forestland, timberland, or timberland zoned timberland production?

This impact is addressed in Section 6.2(a) above.

d. Result in the loss of forestland or conversion of forestland to non-forest use?

This impact is addressed in Section 6.2(a) above.

e. Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of farmland, to non-agricultural use or conversion of forestland to non-forest use?

This impact is addressed in Section 6.2(a) above.

6.3 Air Quality

This section is based primarily on an Air Quality Impact Analysis completed for the project, included as Appendix 2 of the Initial Study.

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?		✓		
b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality?			✓	
c. Expose sensitive receptors to substantial pollutant concentrations?		✓		
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			✓	

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Table 6.3-A provides definitions for the air quality terms used in this section.

TABLE 6.3-A
Air Quality Definitions

Carbon Monoxide (CO)
A colorless, odorless gas resulting from the incomplete combustion of hydrocarbon fuels. CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects. Over 80 percent of the CO emitted in urban areas is contributed by motor vehicles. CO is a criteria air pollutant.
Nitrogen Oxides (Oxides of Nitrogen, NO_x)
A general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO_2) and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant and may result in numerous adverse health effects.
Particulate Matter (PM)
Any material, except pure water, that exists in the solid or liquid state in the atmosphere. The size of particulate matter can vary from coarse, wind-blown dust particles to fine particle combustion products.
$PM_{2.5}$
Includes tiny particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.
PM_{10} (Particulate Matter)
A criteria air pollutant consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs where they may be deposited and result in adverse health effects. PM_{10} also causes visibility reduction.
Reactive Organic Gas (ROG)
A photochemically reactive chemical gas, composed of non-methane hydrocarbons, that may contribute to the formation of smog. Also, sometimes referred to as Non-Methane Organic Gases (NMOGs). (See also Volatile and Hydrocarbons.)
Sulfur Dioxide (SO_2)
A strong smelling, colorless gas that is formed by the combustion of fossil fuels. Power plants, which may use coal or oil high in sulfur content, can be major sources of SO_2 and other sulfur oxides contribute to the problem of acid deposition. SO_2 is a criteria air pollutant.
Source: California Air Resources Board. *Glossary of Air Pollution Terms* (2015)

Would the project:

a. Conflict with or obstruct implementation of the applicable air quality plan?

In accordance with San Joaquin Valley Air Pollution Control District (SJVAPCD)-recommended methodology for the assessment of air quality impacts, projects that result in significant air quality impacts at the project level are also considered to have a significant cumulative air quality impact. As noted in Section 6.3(b) below, short-term construction and long-term operational emissions would not exceed applicable thresholds. In addition, the proposed project's contribution to localized concentrations of emissions, including emissions of CO, TACs, and odors, are considered less than significant. However, as noted in Section 6.3(c), the proposed project could result in a significant contribution to localized PM concentrations for which the SJVAB is currently designated non-attainment. For this reason, implementation of the proposed project could conflict with air quality attainment or maintenance planning efforts. This impact would be considered potentially significant.

Mitigation Measure: Implement Mitigation Measures AQ-1 through AQ-10

Level of Significance after Mitigation: With mitigation, short-term construction activities would be required to comply with SJVPACD Regulation VIII (Fugitive PM10 Prohibitions). Mandatory compliance with SJVAPCD Regulation VIII would reduce emissions of fugitive dust from the project site and minimize the project's potential to adversely affect nearby sensitive receptors. Compliance with SJVAPCD Regulation VIII would reduce fugitive emissions of PM by approximately 50 percent, or more. Additional measures have also been included to minimize emissions generated by onsite equipment and vehicles. With mitigation, this impact would be considered less than significant.

b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality?

The proposed project is located in the City of Fresno, which is within the San Joaquin Valley Air Basin (SJVAB). The SJVAB is designated nonattainment for the national 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the U.S. EPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM10 Maintenance Plan (SJVAPCD 2019). Potential air quality impacts associated with the proposed project could potentially occur during project construction or operational phases. Short-term construction and long-term air quality impacts associated with the proposed project are discussed, as follows:

Short-term Construction Emissions

Short-term increases in emissions would occur during the construction process. Construction-generated emissions are of temporary duration, lasting only as long as construction activities occur, but have the potential to represent a significant air quality impact. The construction of the proposed project would result in the temporary generation of emissions associated with site grading and excavation, paving, motor vehicle exhaust associated with construction equipment and worker trips; as well as, the movement of construction equipment on unpaved surfaces. Short-term construction emissions would result in increased emissions of ozone-precursor pollutants (i.e., ROG and NOx) and emissions of PM. Emissions of ozone-precursors would result from the operation of on-road and off-road motorized vehicles and equipment. Emissions of airborne PM are largely dependent on the amount of ground disturbance associated with site preparation activities and can result in increased concentrations of PM that can adversely affect nearby sensitive land uses.

Short-term construction emissions associated with the proposed project were calculated using the CalEEMod computer program[3]. Emissions were quantified for demolition, site preparation, grading, building construction, and application of architectural coatings. Detailed construction information, including construction schedules and equipment requirements, have not been identified for the proposed project. Default construction phases and equipment assumptions contained in the CalEEMod model were, therefore, relied upon for the calculation of construction-generated emissions.

Estimated annual and daily construction-generated emissions are discussed in greater detail, as follows:

<u>Annual Construction Emissions</u>

The proposed project would generate maximum uncontrolled annual emissions of approximately 0.99 tons/year of ROG, 5.85 tons/year of NO_X, 4.46 tons/year of CO, 0.01 tons/year of SO_2, 0.81 tons/year of PM_{10}, and 0.42 tons/year of $PM_{2.5}$ (see Table 6.3-B). Estimated construction-generated emissions would not exceed the SJVAPCD's significance thresholds of 10 tons/year of ROG, 10 tons/year of NO_X, or 15 tons/year of PM_{10} or $PM_{2.5}$.

[3] Modeling assumptions and output files from CalEEMod Version 2016.3.2 for the project are included in Appendix A of the Air Quality and Greenhouse Gas Analysis (Initial Study Appendix 2).

Table 6.3-B
Annual Construction Emissions

Construction Phase	Uncontrolled Maximum Annual Emissions (TPY)[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Construction Year 1						
Demolition	0.04	0.39	0.23	0.00	0.04	0.02
Site Preparation	0.02	0.23	0.11	0.00	0.10	0.06
Grading	0.07	0.82	0.51	0.00	0.17	0.09
Building Construction	0.11	0.95	0.74	0.00	0.11	0.06
Total:	0.24	2.38	1.59	0.00	0.42	0.22
Construction Year 2						
Building Construction	0.37	3.30	2.68	0.01	0.38	0.19
Paving	0.01	0.14	0.15	0.00	0.01	0.01
Architectural Coating	0.37	0.02	0.03	0.00	0.00	0.00
Total:	0.75	3.46	2.86	0.01	0.39	0.20
Maximum Annual Emissions:	0.99	5.85	4.46	0.01	0.81	0.42
Significance Thresholds:	10	10	None	None	15	15
Exceeds Thresholds/Significant Impact?:	No	No	No	No	No	No

1. Based on CalEEMod computer modeling. Totals may not sum due to rounding. Does not include emission control measures. Construction start date has not yet been identified. To be conservative, emissions modeling assumes construction could begin in 2019. Future year emissions would be less.

Source: Ambient 2019. Refer to Appendix A of the Air Quality & Greenhouse Gas Impact Analysis (Initial Study Appendix 2) for modeling results and assumptions.

Daily Construction Emissions

Estimated average-daily construction emissions are summarized in Table 6.3-C. The proposed project would generate maximum uncontrolled average-daily emissions of approximately 40.07 lbs/day of ROG, 35.78 lbs/day of NO_X, 32.11 lbs/day of CO, 11.05 lbs/day of PM_{10}, and 5.79 lbs/day of $PM_{2.5}$. The highest average-daily emissions would generally occur during the demolition of the existing structures and site grading activities. Emissions of SO_2 would be negligible (i.e., less than 0.1 lbs/day). Estimated average-daily on-site construction emissions would not exceed the SJVAPCD's significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated.

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Table 6.3-C
Daily On-Site Construction Emissions

Construction Phase	Uncontrolled Daily Emissions (lbs/day)[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition	3.51	35.78	22.06	0.04	3.93	1.99
Site Preparation	1.45	15.19	7.35	0.01	6.82	4.05
Grading	4.74	54.52	33.38	0.06	11.05	5.79
Building Construction – Year 1	3.37	30.04	24.46	0.04	1.84	1.73
Building Construction – Year 2	1.97	17.80	15.63	0.02	1.04	0.97
Paving	1.36	14.07	14.65	0.02	0.75	0.69
Architectural Coating	36.74	1.68	1.83	0.00	0.11	0.11
Maximum Daily On-site Emissions:	40.07	35.78	32.11	0.05	11.05	5.79
Significance Thresholds:	100	100	100	100	100	100
Exceeds Thresholds/Significant Impact?:	No	No	No	No	No	No

1. Based on CalEEMod computer modeling. Totals may not sum due to rounding. Does not include emission control measures, including dust control per Regulation VIII.

2. Average daily on-site emissions are based on total on-site emissions divided by the total number of construction days.

3. Maximum daily on-site emissions assumes building construction, paving, and architectural coating application could potentially occur simultaneously.

Source: Ambient 2019. Refer to Appendix A of the Air Quality & Greenhouse Gas Impact Analysis (Initial Study Appendix 2) for modeling results and assumptions.

Short-term construction of the proposed project would not result in a significant impact to regional or local air quality conditions. Furthermore, it is important to note that project construction, including excavation and grading activities, would be required to comply with SJVPACD Regulation VIII (Fugitive PM_{10} Prohibitions). Mandatory compliance with SJVAPCD Regulation VIII would further reduce emissions of fugitive dust from the project site and minimize the project's potential to adversely affect nearby sensitive receptors. With compliance with SJVAPCD Regulation VIII, emissions of PM would be reduced by approximately 50 percent, or more. Given that project-generated emissions would not exceed applicable SJVAPCD significance thresholds, this impact would be considered less than significant.

Long-term Operational Emissions

Long-term operational emissions of criteria air pollutants associated with the proposed project were calculated using the CalEEMod computer program. Modeling was conducted based on traffic data derived, in part, from the Traffic Impact Analysis prepared for the proposed project (JLB 2019). Mobile source emissions were conservatively based on the default fleet distribution assumptions contained in the model. All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model[4]. Exposure to localized concentrations of other pollutants, including fugitive dust, mobile-source CO, and odors were qualitatively assessed. As previously noted, an estimated date of project construction and opening date are dependent, in part, on yet-to-be-identified funding. To be conservative, operation of the project was assumed

[4] Modeling assumptions and output files from CalEEMod Version 2016.3.2 for the project are included in Appendix A of the Air Quality and Greenhouse Gas Analysis (Initial Study Appendix 2).

to begin in 2020. Due to anticipated reductions in future fleet-average mobile-source and energy emission rates, emissions for post-year 2020 operational conditions would be less.

Estimated annual operational emissions for the proposed project are summarized in Table 6.3-D. As depicted, the proposed project would generate approximately 1.24 tons/year of ROG, 7.53 tons/year of NO_X, 5.84 tons/year of CO, 1.47 tons/year of PM_{10}, and 0.43 tons/year of $PM_{2.5}$. Operational emissions of SO_2 would be negligible (i.e., less than 0.1 tons/year). It is important to note, however, that these estimates include mobile-source emissions associated with existing operations, which would be relocated with project implementation. When taking into account existing vehicle trips, the proposed expansion would result in net increases of approximately 0.68 tons/year of ROG, 0.95 tons/year of NO_X, 0.71 tons/year of CO, 0.14 tons/year of PM_{10}, and 0.05 tons/year of $PM_{2.5}$ during the initial year of operation. Operational emissions would be projected to decline in future years, with improvements in fuel consumption emissions standards. Operational emissions would not exceed SJVAPCD's mass-emissions significance thresholds.

Estimated average-daily on-site operational emissions are also summarized in Table 6.3-D. Average-daily on-site operational emissions would be largely associated with area sources (e.g., landscape maintenance activities and use of consumer products) and the use of natural-gas fired appliances. Average-daily on-site emissions would total approximately 6.18 lbs/day of ROG and approximately 1.1 lbs/day each of NO_X and CO. Average-daily on-site emissions of other pollutants would be negligible (i.e., less than 0.1 lbs/day). Average-daily on-site emissions would not exceed the SJVAPCD's recommended localized ambient air quality significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated.

Table 6.3-D
Long-term Operational Emissions (Unmitigated)

Season	Uncontrolled Daily Emissions (tons/year)[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Area Source	0.60	0.00	0.02	0.00	0.00	0.00
Energy Use	0.02	0.13	0.11	0.00	0.01	0.01
Mobile Source[2]	0.63	7.40	5.71	0.03	1.46	0.42
Total:	1.24	7.53	5.84	0.03	1.47	0.43
Less Existing Mobile-Source Emissions[3]:	-0.56	-6.58	-5.13	-0.02	-1.33	-0.38
Net Increase:	0.68	0.95	0.71	0.01	0.14	0.05
Significance Thresholds (tons):	10	10	None	None	15	None
Exceeds Thresholds/Significant Impact?:	No	No	--	--	No	--
Average Daily On-site Emissions (lbs)[4]:	6.18	1.11	1.11	0.01	0.09	0.09
Significance Thresholds (lbs):	100	100	100	100	100	100
Exceeds Thresholds/Significant Impact?:	No	No	No	No	No	No

1. Emissions were calculated using the CalEEMod computer program. Does not include implementation of emissions control measures.

2. Fleet distribution data for the project is not available. Mobile source emissions are conservatively based on default vehicle fleet distribution for Fresno County, which includes all vehicle types/classifications, including medium and heavy-duty vehicles. Actual emissions would likely be lower.

3. Reflects vehicle trips already associated with existing operations that would be relocated with project implementation.

4. Based on calculated annual operational emissions from area sources and an average of 240 operational days annually.

Source: Ambient 2019. Refer to Appendix A of the Air Quality & Greenhouse Gas Impact Analysis (Initial Study Appendix 2) for modeling results and assumptions.

Long-term operation of the proposed project would not result in a significant impact to regional or local air quality conditions. It is important to note that estimated operational emissions are conservatively based on the default vehicle fleet distribution assumptions contained in the model, which include contributions from medium and heavy-duty trucks. Mobile sources associated with schools typically consist largely of light-duty vehicles. As a result, actual operational emissions would likely be slightly less than indicated. This impact is considered less than significant.

c. Expose sensitive receptors to substantial pollutant concentrations?

Sensitive land uses located in the vicinity of the proposed project site consist predominantly of residential land uses. The nearest residential land uses are located adjacent to the western boundary of the project site. Residential land uses are also located to the south and east of the project site (refer to Figure 1). Long- term operational and short-term construction activities and emission sources that could adversely impact these nearest sensitive receptors are discussed, as follows:

Long-term Operation

Localized Mobile-Source CO Emissions

Carbon monoxide is the primary criteria air pollutant of local concern associated with the proposed project. Under specific meteorological and operational conditions, such as near areas of heavily congested vehicle traffic, CO concentrations may reach unhealthy levels. If inhaled, CO can be absorbed easily by the blood stream and can inhibit oxygen delivery to the body, which can cause significant health effects ranging from slight headaches to death. The most serious effects are felt by individuals susceptible to oxygen deficiencies, including people with anemia and those suffering from chronic lung or heart disease.

Mobile-source emissions of CO are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. For this reason, modeling of mobile-source CO concentrations is typically recommended for sensitive land uses located near signalized roadway intersections that are projected to operate at unacceptable levels of service (i.e., LOS E or F). Localized CO concentrations associated with the proposed project would be considered less than significant if: 1) traffic generated by the proposed project would not result in deterioration of a signalized intersection to a LOS of E or F; or 2) the project would not contribute additional traffic to a signalized intersection that already operates at LOS of E or F.

Signalized intersections in the project area include the intersections of Blackstone Avenue/Weldon Avenue and Blackstone Avenue/McKinley Avenue. With implementation of the proposed traffic improvements, these intersections are projected to operate at LOS D, or better, for existing-plus-project, near-term, and future cumulative conditions (JBL 2019). In comparison to the CO screening criteria, implementation of the proposed project would not result in or contribute to unacceptable levels of service (i.e., LOS E, or worse) at nearby signalized intersections. As a result, the proposed project would not be anticipated to contribute substantially to localized CO concentrations that would exceed applicable standards. For this reason, this impact would be considered less than significant.

Toxic Air Contaminants

Implementation of the proposed project would not result in the long-term operation of any major onsite stationary sources of TACs, nor would project implementation result in a significant increase in diesel-fueled vehicles traveling along area roadways. In addition, with implementation of the proposed project student facilities (e.g., Science Building, Child Development Center) would be largely contained within the existing campus boundaries. No major stationary sources of TACs were identified in the project vicinity that would result in increased exposure of students or staff to TACs. For these reasons, long-term increases in exposure to TACs would be considered less than significant.

Short-term Construction

Naturally Occurring Asbestos

Naturally-occurring asbestos, which was identified by Air Resources Board (ARB) as a Toxic Air Contaminant (TAC) in 1986, is located in many parts of California and is commonly associated with ultramafic rock. The project site is not located near any areas that are likely to contain ultramafic rock (DOC 2000). As a result, risk of exposure to asbestos during the construction process would be considered less than significant.

Asbestos-Containing Materials

Demolition activities can have potential negative air quality impacts, including issues surrounding proper handling, demolition, and disposal of asbestos containing material (ACM). Asbestos containing materials could be encountered during demolition of existing buildings, particularly older structures constructed prior to 1970. Asbestos can also be found in various building products, including (but not limited to) utility pipes/pipelines (transite pipes or insulation on pipes). If a project will involve the disturbance or potential disturbance of ACM, various regulatory requirements may apply, including the requirements stipulated in the National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M-Asbestos NESHAP). These requirements include but are not limited to: 1) notification, within at least 10 business days of activities commencing, to the APCD, 2) an asbestos survey conducted by a Certified Asbestos Consultant, and, 3) applicable removal and disposal requirements of identified ACM.

The proposed project would include the demolition of existing onsite structures. The demolition of existing structures may result in disturbance of ACM. This impact is considered potentially significant.

Lead-Coated Materials

Demolition of structures coated with lead-based paint can have potential negative air quality impacts and may adversely affect the health of nearby individuals. Lead-based paints could be encountered during demolition of existing buildings, particularly older structures constructed prior to 1978. Improper demolition can result in the release of lead-containing particles from the site. Sandblasting or removal of paint by heating with a heat gun can result in significant emissions of lead. In such instances, proper abatement of lead before demolition of these structures must be performed in order to prevent the release of lead from the site. Federal and State lead regulations, including the Lead in Construction Standard (29 CFR 1926.62) and California Code of Regulations (CCR Title 8, Section 1532.1, Lead) regulate disturbance of lead-containing materials during construction, demolition, and maintenance-related activities. Depending on removal method, a SJVAPCD permit may be required.

The proposed project would include the demolition of existing onsite structures. The demolition of existing structures may result in disturbance of lead containing materials. This impact is considered potentially significant.

Diesel-Exhaust Emissions

Implementation of the proposed project would result in the generation of Diesel Particulate Matter (DPM) emissions during construction associated with the use of off-road diesel equipment for site grading and excavation, paving, and other construction activities. Health-related risks associated with diesel-exhaust emissions are primarily associated with long-term exposure and associated risk of contracting cancer. For residential land uses, the calculation of cancer risk associated with exposure of to TACs are typically calculated based on a 25- to 30-year period of exposure. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Assuming that construction activities involving the use of diesel-fueled equipment would occur over an approximate 18-month period, project-related construction activities would constitute less than six percent of the typical exposure period. As a result, exposure to construction-generated DPM would not be anticipated to exceed applicable thresholds (i.e., incremental increase in cancer risk of 20 in one million). In addition, implementation of the air quality mitigation measures would result in further reductions of on-site DPM emissions. For these reasons, this impact would be considered less than significant.

Localized PM Concentrations

Fugitive dust emissions would be primarily associated with building demolition, site preparation and grading, and vehicle travel on unpaved and paved surfaces. On-site off-road equipment and trucks would also result in short-term emissions of diesel-exhaust PM, which could contribute to elevated localized concentration at nearby receptors. Uncontrolled emissions of fugitive dust may also contribute to increased occurrences of Valley Fever and potential increases in nuisance impacts to nearby receptors. For these reasons, localized uncontrolled concentrations of construction-generated PM would be considered to have a potentially significant impact.

Mitigation Measures AQ-1 through AQ-10: Measures to Reduce Localized Pollutant Concentrations.

The following measures shall be implemented to reduce potential expose of sensitive receptors to localized pollutant concentrations associate with project construction. The term "construction" as used here shall refer broadly to pre-operational site preparation activities, including but not limited to, demolition, grading, and paving.

AQ-1. Demolition of onsite structures shall comply with all applicable regulatory requirements, including, but not limited to, SJVAPCD Rule 4002 (NESHAP), and National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M - asbestos NESHAP), Lead in Construction Standard (29CFR1926.62) and California Code of Regulations Title 8, Section 1532.1, Lead. These requirements may include: 1) responsible agency notifications, 2) lead-based paint or asbestos surveys, and, 3) applicable removal and disposal requirements. More information on asbestos-containing materials and applicable regulatory requirements can be found at website url: https://www.valleyair.org/newsed/asbestos.pdf. Additional information regarding lead-based paint and applicable regulatory requirements can be found at website URLs: https://www.epa.gov/lead/lead-abatement-inspection-and-risk-assessment and https://www.dir.ca.gov/title8/1532_1.html.

AQ-2. On-road diesel vehicles shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles:

a. Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location, except as noted in Subsection (d) of the regulation; and,
b. Shall not operate a diesel-fueled auxiliary power system to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation.

AQ-3. Off-road diesel equipment shall comply with the 5-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use Off-road Diesel regulation. The specific requirements and exceptions in the regulations can be reviewed at the following web sites: www.arb.ca.gov/msprog/truck-idling/2485.pdf and www.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf.

AQ-4. Signs shall be posted at the project site construction entrance to remind drivers and operators of the state's five-minute idling limit.

AQ-5. To the extent available, replace fossil-fueled equipment with alternatively-fueled (e.g., natural gas) or electrically-driven equivalents.

AQ-6. Construction truck trips shall be scheduled, to the extent possible, to occur during non-peak hours, and truck haul routes shall be selected to minimize impacts to nearby residential dwellings.

AQ-7. The burning of vegetative material shall be prohibited.

AQ-8. Low VOC-content (50 grams per liter, or less) exterior and interior building paints shall be used. To the extent locally available, use prefinished/pre-colored materials.

AQ-9. The proposed project shall comply with SJVAPCD Regulation VIII for the control of fugitive dust emissions. Regulation VIII can be obtained on the SJVAPCD's website: https://www.valleyair.org/rules/1ruleslist.htm. At a minimum, the following measures shall be implemented:

a. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.

b. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.

c. All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut & fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.

d. When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.

e. Trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)

f. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.

g. On-road vehicle speeds on unpaved surfaces of the project site shall be limited to 15 mph.

h. Sandbags or other erosion control measures shall be installed sufficient to prevent silt runoff to public roadways from sites with a slope greater than one percent.

i. Excavation and grading activities shall be suspended when winds exceed sustained speeds of 20 miles per hour (Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation).

AQ-10. The above measures for the control of construction-generated emissions shall be included on site grading and construction plans.

Level of Significance after Mitigation: Implementation of Mitigation Measures AQ-1 through AQ-10 would include measures to ensure compliance with applicable regulatory requirements pertaining to the handling and disposal of hazardous materials that may be encountered during the construction process (e.g., asbestos containing materials, lead-based paints). Additional measures have also been included to reduce construction-generated emissions that could contribute to increases in localized pollutant concentrations at nearby sensitive receptors. These measures include SJVAPCD-recommended measures, which would help to ensure compliance with applicable SJVAPCD rules and regulations. With mitigation, this impact would be considered less than significant.

d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Other emissions potentially associated with the proposed project would be predominantly associated to the generation of odors during project construction. The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies.

Construction of the proposed project would involve the use of a variety of gasoline or diesel-powered equipment that would emit exhaust fumes. Exhaust fumes, particularly diesel-exhaust, may be considered objectionable by some people. In addition, pavement coatings and architectural coatings used during project construction would also emit temporary odors. However, construction-generated emissions would occur intermittently throughout the workday and would dissipate rapidly within increasing distance from the source. As a result, short-term construction activities would not expose a substantial number of people to frequent odorous emissions. In addition, no major sources of odors have been identified in the project area. This impact would be considered less than significant.

6.4 Biological Resources

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U. S. Fish and Wildlife Service?		✓		
b. Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U. S. Wildlife Service?				✓
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				✓
d. Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites?				✓
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				✓

f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				✓

Would the project:

a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U. S. Fish and Wildlife Service?

The project site is located in a highly developed area and is identified as "urban" land in the Biological Resources section of the City of Fresno General Plan Master EIR. As discussed in the MEIR, urban land provides poor quality habitat for any special status species, and special status species are not expected to occur within urban areas (General Plan MEIR, p. 5.4-9). Such land is of limited habitat value for sensitive plant and wildlife species due to the amount of disturbance from humans, vehicles, and domestic animals on a regular basis. However, given the presence of established trees and vegetation, migratory birds could be nesting on the project site and vicinity, most of which are protected by the Migratory Bird Treaty Act (USCA 1918). Construction-related disturbance could result in nest abandonment or direct mortality of eggs, chicks, and/or fledglings. To avoid impacts to nesting migratory birds, Mitigation Measure BR-1, below, is incorporated into the project.

Mitigation Measure BR-1: Mitigation for Potential Impacts to Nesting Migratory Birds

1. Avoidance: If feasible, any vegetation removal within the project area shall take place between September 1 and February 1 to avoid impacts to nesting birds in compliance with the Migratory Bird Treaty Act (MBTA). No surveys will be required if project timing occurs outside the bird breeding season. If vegetation removal must occur during the nesting season, project construction may be delayed due to actively nesting birds and their required protective buffers.

2. Pre-construction Surveys: If construction is to begin during the nesting season (February 1 through August 31), a qualified biologist shall conduct a pre-construction survey within 14 days prior to initiation of disturbance activities. This survey will search for nest sites within the project area. If the pre-construction survey does not detect any active nests, then no further action is required. If the survey does detect an active nest, then the District shall implement the following:

3. Minimization/Establish Buffers: If any active nests are discovered (and if construction will occur during bird breeding season), the District shall contact the United States Fish and Wildlife Service and/or California Department of Fish and Wildlife to determine protective measures required to avoid take. These measures could include fencing an area where a nest occurs or shifting construction work temporally or spatially away from the nesting birds. Biologists would be required on site to monitor construction activity while protected migratory birds are nesting in the project area. If an active nest is found after the completion of the pre-construction surveys and after construction begins, all construction activities shall stop until a qualified biologist has evaluated the nest and erected the appropriate buffer around the nest.

Level of Significance after Mitigation: Compliance with the recommended mitigation measures would reduce the project's potential to adversely affect migratory bird nesting to a less than significant level.

b. Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U. S. Wildlife Service?

There are no riparian or sensitive natural communities within the project area, thus no impact would occur.

c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No impact would occur. There are no federally protected wetlands within the project area. Implementation of typical ground disturbance and erosion control Best Management Practices (BMPs) and compliance with grading permits will ensure that there is no impact to storm drainage facilities or nearby canals.

d. Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The project will not result in impacts that substantially interfere with wildlife movements. The site does not appear to constitute a "movement corridor" for native wildlife (USFWS 1998) that would attract wildlife to move through the site. As discussed above, the project is located on a heavily disturbed site in a highly urbanized area. The project site is bordered by busy arterial and residential streets, a condition which restricts access for wildlife. Smaller wildlife species and birds are not expected to be further inhibited by the project as compared with existing development and uses.

e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No impact would occur. The project would not conflict with local policies or ordinances protecting biological resources.

f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?

The City of Fresno is not located within the boundaries of any Habitat Conservation Plan or Natural Conservation Community Plan, so the project would not conflict any provisions of any local, regional, or state habitat conservation plan.

6.5 Cultural Resources

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines § 15064.5?		✓		
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines § 15064.5?		✓		
c. Disturb any human remains, including those interred outside of formal cemeteries?		✓		

Would the project:

a. Cause a substantial adverse change in the significance of a historical resource pursuant to State CEQA Guidelines Section 15064.5?

The project entails demolition, building alteration, and site preparation activities (e.g. excavation and grading) which have the potential to impact historical and/or archeological resources. The project site and surrounding vicinity is highly disturbed, consisting of existing educational and administrative facilities, parking lots, residential housing, and commercial development; these conditions are indicative of a low potential to impact sensitive resources.

Development in the project vicinity, given its age and history, includes structures and other features potentially eligible for designation as historical resources, as well as resources that already appear on registers at the local, state, and/or national level. To evaluate potential impacts to historic structures, Karana Hattersley-Drayton, M.A., Architectural Historian, prepared a Historic Architectural Survey Report (HASR), which is included as Appendix 3 of this Initial Study. The HASR includes an overview of the history and development of both the City of Fresno and the project site itself, and it includes documentation and evaluation of the buildings currently located on the project site. Each building was evaluated for the potential of the proposed project to significantly impact a historic resource.

Per the HASR, no historic resources were identified on any of the adjacent parcels to be added to the campus as part of the project. Regarding the existing FCC campus, although the campus includes two designated historic resources including the Old Administration Building (1916, National Register and Local Register) as well as the Fresno City College Library (1931, Local Register), neither resource will be impacted by the proposed project. In addition, the Porter Tract Historic District (Local Register), located on the north side of the campus, will not be adversely affected by this project. Based on this information, the project’s impact on historic buildings is considered less than significant.

While there are no known or visible cultural or archaeological resources that exist on the surface of the project area, development of the project could potentially impact yet-to-be-discovered historical, archaeological, or other subsurface resources within the project site area. In the event that subsurface cultural resources are discovered during development of the proposed facilities, the following mitigation measures will be incorporated into the project.

Mitigation Measures CR-1 through CR-3: Mitigation for Potential Discovery of Subsurface Cultural Resources

Mitigation Measure CR-1: If previously unknown subsurface resources are encountered before or during excavation or grading activities, construction shall stop in the immediate vicinity of the find and a qualified historical resources specialist shall be consulted to determine whether the resource requires further study. The qualified historical resources specialist shall make recommendations to the District on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with Section 15064.5 of the CEQA Guidelines and the City of Fresno’s Historic Preservation Ordinance. If the resources are determined to be unique historical resources as defined under Section 15064.5 of the CEQA Guidelines, measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources.

Mitigation Measure CR-2: In the event that buried prehistoric archaeological resources are discovered during excavation and/or construction activities, construction shall stop in the immediate vicinity of the find and a qualified archaeologist shall be consulted to determine whether the resource requires further study. The qualified archaeologist shall make recommendations to the District on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with Section 15064.5 of the CEQA Guidelines. If the resources are determined to be unique prehistoric archaeological resources as defined under Section 15064.5 of the CEQA Guidelines, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. Any prehistoric archaeological artifacts recovered as a result of mitigation shall be provided to a District-approved institution or person who is capable of providing long-term preservation to allow future scientific study.

Mitigation Measure CR-3: In the event that human remains are unearthed during excavation and grading activities of any future development project, all activity shall cease immediately. Pursuant to Health and Safety Code (HSC) Section 7050.5, no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98(a). If the remains are determined to be of Native American descent, the coroner shall within 24 hours notify the Native American Heritage Commission (NAHC). The NAHC shall then contact the most likely descendent of the deceased Native American, who shall then serve as the consultant on how to proceed with the remains. Pursuant to PRC Section 5097.98(b), upon the discovery of Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located is not damaged or disturbed by further development activity until the landowner has discussed and conferred with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment.

Level of Significance after Mitigation: With incorporation of the proposed mitigation measures, the project's potential impact to subsurface resources will be less than significant.

b. Cause a substantial adverse change in the significance of an archeological resource pursuant to State CEQA Guidelines Section 15064.5?

This impact is addressed in Section 6.5(a) above.

c. Disturb any human remains, including those interred outside of dedicated cemeteries?

This impact is addressed in Section 6.5(a) above.

6.6 Energy

This section is based primarily on an Energy Impact Assessment completed for the project, included as Appendix 4 of the Initial Study.

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?		✓		

b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?		✓		

Would the project

a. Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

In December 2018, the CEQA Guidelines Appendix G Checklist was updated to include a section for analysis of potential energy impacts associated with a proposed project. Where necessary, CEQA requires that mitigation measures be incorporated to reduce the inefficient, wasteful, or unnecessary consumption of energy. The State CEQA Guidelines, however, do not establish criteria that define inefficient, wasteful, or unnecessary consumption. Compliance with the State's building standards for energy efficiency would result in decreased energy consumption for proposed buildings. However, compliance with building codes may not adequately address all potential energy impacts associated with project construction and operation. As a result, this analysis includes an evaluation of electricity and natural gas usage requirements associated with future development, as well as, energy requirements associated with the use of on-road and off-road vehicles. The degree to which the proposed project would comply with existing energy standards, as well as, applicable regulatory requirements and policies related to energy conservation was also taken into consideration for the evaluation of project-related energy impacts. (See generally the Energy Impact Assessment, included as Appendix 4 of this Initial Study, for more information)

Implementation of the proposed project would increase electricity, diesel, gasoline, and natural gas consumption associated with construction activities, as well as long-term operational activities. Energy consumption associated with short-term construction and long-term operational activities are discussed in greater detail, as follows:

Construction-Related Energy Consumption

Energy consumption would occur during construction of the proposed facilities, including fuel use associated with the on-site operation of off-road equipment and vehicles traveling to and from the construction site. Table 6.6-A summarizes the projected levels of energy consumption associated with project construction. As depicted, operation of off-road construction equipment would use an estimated total of 46,670 gallons of diesel fuel. On-road vehicles would use approximately 19,743 gallons of gasoline and 6,953 gallons of diesel fuel. In total, fuel use would equate to approximately 9,744 million British thermal units per year (MMBU) over the life of the construction project. Construction equipment use and associated energy consumption would be typical of that commonly associated with the construction of new land uses. As a result, project construction would not be anticipated to require the use of construction equipment that would be less energy efficient than those commonly used for the construction of similar facilities. Idling of on-site equipment during construction would be limited to no more than five minutes in accordance with San Joaquin Valley Air Pollution Control District (SJVAPCD) requirements. Furthermore, on-site construction equipment may include alternatively-fueled vehicles (e.g., natural gas) where feasible. Energy use associated with construction of the proposed facilities would be temporary and would not be anticipated to result in the need for additional capacity, nor would construction be anticipated to result in increased peak-period demands for electricity. As a result, the construction of proposed facilities and improvements would not result in an inefficient, wasteful, or unnecessary consumption of energy. As a result, impacts are considered less than significant.

Table 6.6-A
Projected Construction Energy Consumption

Source	Total Fuel Use (gallons)	Total MMBTU
Off-Road Equipment Use (Diesel)	46,670	6,412
On-Road Vehicles (Gasoline)	19,743	2,378
On-Road Vehicles (Diesel)	6,953	955
	Total:	9,744

Fuel use was calculated based, in part, on default construction schedules, equipment use, and vehicle trips identified for the construction of similar land uses contained in the CalEEMod output files prepared for the air quality analysis conducted for this project. Refer to Appendix A of the Energy Impact Assessment (Initial Study Appendix 4) for modeling assumptions and results.

Source: Ambient 2019

Operational Mobile-Source Energy Consumption

Operational mobile-source energy consumption would be primarily associated with commute trips to and from the campus. Energy use associated with commute trips are discussed in greater detail, as follows:

Table 6.6-B summarizes the projected total fuel use at build-out of the proposed land uses. The proposed land uses would consume an estimated 701 gallons/year of diesel fuel and an estimated 135,093 gallons/year of gasoline. However, a large majority of the estimated fuel use (roughly 90 percent) would be associated with existing vehicle trips, which would be relocated with project implementation. As a result, the proposed project would not result in increased fuel usage that would be considered unnecessary, inefficient, or wasteful. This impact would be considered less than significant.

Table 6.6-B
Projected Operational Fuel Consumption

Source	Total Fuel Use (gallons)	Total MMBTU
Proposed Land Uses:		
On-Road Vehicles (Diesel)	701	96
On-Road Vehicles (Gasoline)	135,093	16,269
Existing Vehicle Trips to be Relocated:		
On-Road Vehicles (Diesel)	636	87
On-Road Vehicles (Gasoline)	122,632	14,768
	Net Increase:	1,510

Fuel use was calculated based, in part, on default construction schedules, equipment use, and vehicle trips identified for the construction of similar land uses contained in the CalEEMod output files prepared for the air quality analysis conducted for this project. Refer to Appendix A of the Energy Impact Assessment (Initial Study Appendix 4) for modeling assumptions and results.

Source: Ambient 2019

Operational Building-Use Energy Consumption

The proposed project would result in increased electricity and natural gas consumption associated with the long-term operation of the proposed land uses. It is important to note that the proposed buildings would be required to comply with Title 24 standards for energy-efficiency, which would include increased building insulation and energy-efficiency requirements, including the use of energy-efficient lighting, energy-efficient appliances, and use of low-flow water fixtures.

Estimated electricity and natural gas consumption associated with proposed facilities to be constructed as part of the proposed project are summarized in Table 6.6-C. As depicted, new facilities at build-out would result in the consumption of approximately 1,886,154 kilowatt hours per year (kWh/year) of electricity and approximately 622,513 kilo British thermal units per year (kBTU/year) of natural gas. In total, the proposed facilities would use consume a total of approximately 7,058 MMBTU/year. The proposed project would comply with the most current building energy-efficient standards (i.e., Title 24), which would result in increased building energy efficiency and energy conservation. However, detailed project-specific information regarding future on-site energy-conservation measures have not yet been identified. For this reason, implementation of the proposed project could result in wasteful, inefficient, and unnecessary consumption of energy. As a result, this impact would be considered potentially significant.

Table 6.6-C
Projected Operational Electricity and Natural Gas Consumption

Source	Energy Use	MMBTU/Year
Electricity Consumption	1,852,122 kWh/year	6,319
Water Use, Treatment, & Conveyance	34,032 kWh/year	116
Natural Gas Use	622,513 kWh/year	623
	Total:	7,058

Fuel use was calculated based, in part, on default construction schedules, equipment use, and vehicle trips identified for the construction of similar land uses contained in the CalEEMod output files prepared for the air quality analysis conducted for this project. Refer to Appendix A of the Energy Impact Assessment (Initial Study Appendix 4) for modeling assumptions and results.

Source: Ambient 2019

Mitigation Measures: Measures to Reduce or Offset Energy Use

Mitigation Measure E-1: The following measures shall be implemented to reduce or offset energy use associated with the development of future land uses. These measures shall be shown on grading and building plans:

- Meet or exceed CalGreen Tier 2 standards for providing EV charging infrastructure.
- Meet or exceed CalGreen Tier 2 standards for using shading, trees, plants, cool roofs, etc. to reduce the "heat island" effect.
- New buildings shall be designed to achieve a minimum 5-percent improvement beyond 2016 Title 24 building energy-efficiency standards with a goal of achieving net-zero energy use.
- Utilize high efficiency lights in parking lots, streets, and other public areas.
- Incorporate measures and building design features that reduce energy use, water use, and waste generation (e.g., light-colored roofing materials, installation of automatic lighting controls, planting of trees to provide shade).
- Install energy-efficient appliances and building components sufficient to achieve overall reductions in interior energy use beyond those required at the time of development by CalGreen standards.
- New buildings and parking structures shall be designed to accommodate rooftop solar photovoltaic systems.
- Plant drought-tolerant landscaping and incorporate water-efficient irrigation systems where necessary.
- Plant drought-tolerant, native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.

Level of Significance After Mitigation: Mitigation Measure E-1 includes measures that would result in decreased energy consumption and increase reliance on renewable energy sources. With the implementation of Mitigation

Measure E-1, implementation of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy. This impact would be considered less than significant.

b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

As discussed in Section 6.6(a), the proposed land uses would consume an estimated 701 gallons per year of diesel fuel and an estimated 135,093 gallons per year of gasoline. However, a large majority of the estimated fuel use (roughly 90 percent) would be associated with existing vehicle trips, which would be relocated with project implementation. As a result, the proposed project would not result in increased fuel usage that would be anticipated to conflict with applicable plans, policies, or regulations adopted for the purpose of reducing future fuel consumption rates.

The State of California's Energy Efficiency Strategic Plan establishes a goal for the development of building with net zero energy consumption. This plan includes goals pertaining to the construction of new residential, commercial, and governmental buildings. Adherence to current and future Title 24 energy requirements would help to reduce the project's building-use energy consumption. Additional measures would, nonetheless, likely be required to achieve a goal of meeting net-zero energy usage. However, the specific measures to be implemented have not yet been clearly defined. For these reasons, this impact would be considered potentially significant.

Mitigation Measure: Implement Mitigation Measure E-1

Level of Significance After Mitigation: Mitigation measures have been included to reduce overall operational energy consumption, including those associated with long-term operational building energy use. With mitigation, operational energy consumption would be substantially reduced, beyond those required by Title 24 building energy-efficiency requirements. With mitigation, this impact would be considered less than significant.

6.7 Geology and Soils

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:				
(i) rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			✓	
(ii) strong seismic ground shaking?			✓	
(iii) seismic-related ground failure, including liquefaction?			✓	
(iv) landslides?			✓	

b. Result in substantial soil erosion or the loss of topsoil?			✓	
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			✓	
d. Be located on expansive soil, as defined in Table 18-a-B of the Uniform Building Code (1994), creating substantial risks to life or property?			✓	
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				✓
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		✓		

Would the project:

a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:

(i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

(ii) Strong seismic ground shaking?

(iii) Seismic-related ground failure, including liquefaction?

(iv) Landslides?

This impact would be less than significant. Conclusions and recommendations for geologic and soils conditions are presented as follows:

- The project site is not located within the boundaries of an Alquist-Priolo Earthquake Fault Zone, and no active faults are known to traverse the project site.
- Moderate ground shaking caused by events on distant and nearby active faults is considered a possible seismic hazard at the project site; however, this would be true for any potential site within the greater Fresno area and is thus not considered substantially adverse.
- The USDA Natural Resources Conservation Service's Web Soil Survey tool shows the soils underlying the site as types of sandy loam; the site is not located within an area of soils known to have moderately high-to-high expansion potential, thus the risk of expansive soils at the site is considered negligible to low.
- The risk of seismic settlement is considered negligible based on the soil type mapped at the site.
- With depth to groundwater greater than 50 feet and the moderate ground shaking potential at the site, the risk of liquefaction is considered negligible.
- The project site is located in an area with little or no subsidence.

- The project site and surrounding area is generally flat and not a landslide prone area.

In addition to the above, buildings would be constructed in conformance with California Building Code (CBC) Title 24, which identifies specific design requirements to reduce damage from strong seismic ground shaking, ground failure, landslides, soil erosion, and expansive soils.

b. Result in substantial soil erosion or the loss of topsoil?

The project would construct new community college campus facilities on areas that have for the most part been previously developed with hard surfaces and several buildings (e.g. asphalt-paved parking lot areas, existing campus buildings, residential structures on the south side of Cambridge Avenue). The site of the proposed Maintenance & Operations Building parking area, which has previously been heavily disturbed, currently consists of dirt and sparse vegetation.

The potential for water-or wind-borne erosion and loss of topsoil would exist during the construction phase of the proposed project, primarily due to clearing, grubbing, excavation, and grading activities. Once construction is completed, the potential for erosion would be minimal because the ground would be covered by buildings, hard surfaces, and landscaping. The project would be subject to requirements of the State Water Quality Control Board and the San Joaquin Valley Air Pollution Control District. General Construction Permit, Order No. 2012-0006-DWQ, issued by the State Water Quality Control Board in 2012, regulates construction projects of one acre or more, including the proposed project. Projects obtain coverage under the permit by developing and implementing the Storm Water Pollution Prevention Plans, which must specify best management practices that a project would employ to minimize pollution of storm water. Best management practices include erosion controls, sediment controls, wind erosion controls, non-storm water management controls, and waste management and controls (i.e. good housekeeping practices).

The intent of San Joaquin Valley Air Pollution Control District Regulation VIII (Fugitive PM_{10} Prohibitions) is to reduce ambient concentrations of fine particulate matter (PM_{10}) by requiring actions to prevent, reduce or mitigate anthropogenic fugitive dust emissions. The regulation includes specific measures for construction projects. Based on this information, impacts regarding soil erosion and/or loss of topsoil would be less than significant.

c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Based on information presented in Section 6.7(a), impacts related to landslide, lateral spreading, subsidence, liquefaction or collapse are considered less than significant.

d. Be located on expansive soil, as defined in Table 18-a-B of the Uniform Building Code (1994), creating substantial risks to life or property?

As discussed in Section 6.7(a), the site is not located within an area of soils known to have moderately high-to-high expansion potential, and the soil type mapped at the site does not appear likely to present an expansive soil hazard. Therefore, the impact is considered less than significant.

e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No impact would occur. The project would connect to the City of Fresno's sewer system and would not involve the use of septic tanks or alternative wastewater disposal systems.

f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

The project site contains no known surface-level paleontological resources or unique geological features. However, the possibility exist that such resources may be discovered during project excavation and grading activities. SCCCD has incorporated in the project the following mitigation measure to protect any subsurface resources that may be discovered.

Mitigation Measure GS-1: Mitigation for Potential Discovery of Subsurface Paleontological/Geological Resources.

In the event that unique paleontological/geological resources are discovered during excavation and/or construction activities, construction shall stop in the immediate vicinity of the find and a qualified paleontologist shall be consulted to determine whether the resource requires further study. The qualified paleontologist shall make recommendations to the District on the measures that shall be implemented to protect the discovered resources, including but not limited to, excavation of the finds and evaluation of the finds. If the resources are determined to be significant, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds. No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources.

6.8 Greenhouse Gas Emissions

A technical analysis of greenhouse gas emissions was conducted for the project and is included as part of the Air Quality & Greenhouse Gas Impact Analysis (Appendix 2 of this Initial Study).

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			✓	
b. Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?			✓	

Would the project:

a. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Implementation of the proposed project would contribute to increases of GHG emissions that are associated with global climate change. To evaluate the potential significance of the project's GHG generation, the Air Quality & Greenhouse Gas Impact Analysis (Initial Study Appendix 2) utilizes a GHG efficiency threshold based on the project's service population, which is calculated by dividing the GHG emissions inventory goal (allowable emissions) by the estimated service population of the individual project. As discussed in Appendix 2, for most development projects the service population is defined as the sum of the number of jobs and the number of residents provided by a project. However, this traditional definition of service population may not be applicable to all projects, depending on the end use; for instance, with regard to educational facilities, the student and employee population is the primary generator of GHG emissions with a majority of emissions being associated with student vehicle trips. Therefore, the calculated GHG efficiency of the proposed project was expanded to include the proposed student and employee population. GHG efficiency for the proposed project was calculated for years 2020 and 2030 to be consistent with state GHG-reduction target years. The methodology used for quantification of the target efficiency threshold applied to the proposed project is summarized in Table 6.8-A.

Project-generated GHG emissions that would exceed the efficiency threshold of 4.6 $MTCO_2e$ per service population ($MTCO_2e$/SP/year) in year 2020 or 3.3 $MTCO_2e$/SP/year in 2030 would be considered to have a potentially significant impact on the environment that could conflict with GHG-reduction planning efforts. To be conservative, construction-generated GHG emissions were amortized based on an estimated 30-year project life and included in annual operational GHG emissions estimates.

Table 6.8-A

Project-Level GHG Efficiency Threshold Calculation

	Year 2020	Year 2030
Land Use Sectors GHG Emissions Target[1]	272,850,000	213,000,000
Population[2]	40,467,295	43,631,295
Employment[3]	18,862,840	20,795,940
Service Population	59,330,135	64,427,235
GHG Efficiency Threshold ($MTCO_2e$/SP/yr)	4.6	3.3

Based on AB 32 Scoping Plan's land use inventory sectors for years 2020 and 2030; Includes transportation sources.

1. California Air Resources Board. California 1990 Greenhouse Gas Emissions Level and 2020 Limit — by Sector and Activity (Land Use-driven sectors only) MMT CO_2e - (based upon IPCC Fourth Assessment Report Global Warming Potentials)

2. California Department of Finance Demographic Research Unit Report P-2 "State and County Population Projections by Race/Ethnicity and Age (5-year groups)" 2010 through 2060 (as of July 1). Published 12/15/2014

3. California Department of Finance Employment Development Department. Industry Employment Projections Labor Market Information Division 2010-2020 (Published 5/23/2012) and 2012-2022 (Published 9/19/2014)

Source: Ambient 2019

Short-term and long-term GHG emissions associated with the development of the proposed project are evaluated as follows:

Short-term Greenhouse Gas Emissions

Short-term annual GHG emissions associated with the proposed project were calculated using the CalEEMod computer program and are summarized in Table 6.8-B. Based on the modeling conducted, annual emissions of GHGs associated with construction of the proposed project would total approximately 1,023 $MTCO_2e$. There would also be a small amount of GHG emissions from waste generated during construction; however, this amount is speculative. Actual emissions would vary, depending on various factors including construction schedules, equipment required, and activities conducted. Assuming an average project life of 30 years, amortized construction-generated GHG emissions would total approximately 34 $MTCO_2e$/yr. Amortized construction-generated GHG emissions were included in the operational GHG emissions inventory for the evaluation of project-generated GHG emissions (see Table 6.8-C).

Table 6.8-B
Short-Term Construction GHG Emissions

Construction Year	Total GHG Emissions ($MTCO_2e$)
Year 1	326
Year 2	697
Total:	1,023
Amortized Construction Emissions:	34
Source: Ambient 2019. Refer to Appendix A of Air Quality and Greenhouse Gas Analysis (Initial Study Appendix 2) for modeling results and assumptions.	

Long-term Greenhouse Gas Emissions

Estimated long-term increases in GHG emissions associated with the proposed project were calculated using the CalEEMod computer program and are summarized in Table 6.8-C. Based on the modeling conducted, operational GHG emissions would total approximately 3,106 $MTCO_2e$/year in 2020 and approximately 2,568 $MTCO_2e$/year in 2030. It is important to note, however, that these estimates include motor-vehicle emissions associated with existing operations that would be relocated with project implementation. With the removal of these existing motor-vehicle emissions and the inclusion of amortized construction emissions, overall net increases of operational GHG emissions would total approximately 910 $MTCO_2e$/year in 2020 and approximately 763 $MTCO_2e$/year in 2030. Assuming an on-site population of 1,321 students and employees, the calculated GHG efficiency for the proposed project would be 2.4 $MTCO_2e$/SP/year in 2020 and 1.9 $MTCO_2e$/SP/year in 2030. The GHG efficiency for the proposed project would not exceed the thresholds of 4.6 $MTCO_2e$/SP/year in 2020 or 3.3 $MTCO_2e$/SP/year in 2030.

Table 6.8-C
Long-Term Operational GHG Emissions

Emissions Source	Total GHG Emissions ($MTCO_2e$ per year)	
	Year 2020	Year 2030
Energy Use	558	454
Mobile Sources	2,474	2,042
Waste Generation	60	60
Water Use	14	12
Total Project Operational Emissions:	3,106	2,568
Less Existing Mobile-Source Emissions:	-2,230	-1,839
Amortized Construction Emissions:	34	34
Net Increase:	910	763
Service Population:	1,321	1,321
Project GHG Efficiency ($MTCO_2e$/SP/yr):	2.4	1.9
GHG Efficiency Threshold ($MTCO_2e$/SP/yr):	4.6	3.3
Exceeds Threshold/Significant Impact?	No	No
Source: Ambient 2019. Refer to Appendix A of Air Quality and Greenhouse Gas Analysis (Initial Study Appendix 2) for modeling results and assumptions.		

As depicted, operational GHG emissions associated with the proposed project would be predominantly associated with mobile sources. It is important to note that mobile-source emissions were conservatively calculated, based on the default fleet-distribution assumptions contained in the model, which includes medium and heavy-duty vehicles. Mobile sources associated with schools typically consist largely to light-duty vehicles. As a result, actual mobile-source emissions would be less. Nonetheless, because the GHG efficiency for the proposed project would not exceed the efficiency thresholds for 2020 or 2030, this impact would be considered less than significant.

b. Would the project conflict with any applicable plan, policy, or regulation of an agency adopted to reduce the emissions of greenhouse gases?

As discussed in Section 6.8(a) above, the proposed project would not result in increased GHG emissions that would conflict with AB 32 GHG-reduction targets. The proposed project would be designed to meet current building energy-efficiency standards, which includes measures to reduce overall energy use, water use, and waste generation. The project would also be designed to promote the use of alternative means of transportation, such as bicycle use, and to provide improved pedestrian access that would link the project site to nearby land uses. These improvements would help to further reduce the project's GHG emissions and would also help to reduce community-wide GHG emissions. For these reasons, the proposed project would not conflict with local or state GHG-reduction planning efforts. This impact would be considered less than significant.

6.9 Hazards and Hazardous Materials

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			✓	
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			✓	
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			✓	
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?			✓	

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				✓
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			✓	
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?				✓

Would the project:

a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Construction of the project would involve the transport and use of fuels, lubricants, greases, solvents, and architectural coatings including paints. Operation of the project would involve hazardous materials used for cleaning and maintenance of campus facilities and maintenance equipment; this includes (but is not limited to) cleansers, solvents, paints, pesticides, and fertilizers.

During both construction and operational activities, the project would be subject to federal, state, and local regulations governing the routine transport, use, and disposal of hazardous materials and the release of hazardous materials into the environment. For instance, the project would be required to prepare a spill prevention and treatment plan for safe and effective clean-up and disposal of any spills or releases that may occur during construction at the project site. As required under state and federal law, notification and evacuation procedures for site workers and local residents would be included as part of the plan in the event of a hazardous materials release during on-site construction. SWRCB Construction General Permit (2009-0009 DWQ) additionally requires spill prevention and containment plans to avoid spills and releases of hazardous materials and wastes into the environment. Additionally, the use and storage of hazardous materials plus disposal of hazardous wastes are subject to numerous laws and regulations at all levels of government; these regulations function to provide safe accommodations and prevent accidental release to the environment. Operations at the existing FCC campus are already subject to such requirements and would continue to be so during operation of the proposed project.

Based on these factors, impacts pertaining to hazards and hazardous materials are considered less than significant.

b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

The project site and its immediate vicinity were reviewed using web-based mapping tools, including the SWRCB GeoTracker database, DTSC EnviroStor database, and the EPA Enviromapper website. Review of this data did not identify any hazardous materials sites within the project site's boundaries. GeoTracker records identified a Leaking Underground Storage Tank (LUST) cleanup site located at the Utilities Building on the existing Fresno City College (located southwest of the project site at the core of the campus across the railroad tracks); this site is shown as "Completed - Case Closed" as of April 2009. Section 6.9(a) above addresses the potential for release of hazardous materials during construction and/or operation. Based on this information, this impact would be less than significant.

c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

The project site is located within one-quarter mile of Heaton Elementary School (approximately 1,050 feet south of the project site) and Phillip J. Patiño School of Entrepreneurship (a specialized-curriculum public high school campus, located approximately 750 feet east of the project site). Design Science Middle College High School (a specialty school operated by Fresno Unified School District) is also located on the existing Fresno City Campus; it is noted that Design Science is expected to move from its current location east of Blackstone Avenue to the proposed new Science Building at Weldon and Blackstone. No proposed school sites are known to exist within one-quarter mile. It is noted that the FCC campus's proximity to the schools identified above is an existing condition, and the project would not shorten the distance to any existing school campuses within a one-quarter-mile vicinity. The potential for the project to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste is addressed in Section 6.9(a) above and was determined to be less than significant. Thus, this impact is also considered less than significant.

d. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

This impact is addressed in Section 6.9(b) above.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

The project site is not within two nautical miles of a public or private airport and is not within an area subject to an airport land use plan. Because the project site is a considerable distance from the nearest airports and is not subject to an airport land use plan, the project would not result in airport-related safety hazards for students and staff at the project site. Moreover, the project would not result in a change in airport traffic patterns, including an increase in traffic or change that results in substantial safety risks. There would be no impact in relation to airports.

f. Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?

All community colleges have emergency response and evacuation plans. Research conducted for this Initial Study did not identify any adopted emergency response plans or emergency evacuation plans the project could impair. This impact is considered less than significant.

g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

The project site is in an urban area and not within or near an area subject to wildland fires, thus no impact would occur.

6.10 Hydrology and Water Quality

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?			✓	
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			✓	
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:				
(i) result in a substantial erosion or siltation on-or off-site;			✓	
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site;			✓	
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional resources of polluted runoff; or		✓		
(iv) impede or redirect flood flows			✓	
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				✓
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?			✓	

Would the project:

a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

The City of Fresno's water supply and wastewater treatment systems would serve the project. The water supply system complies with applicable water quality standards and the wastewater discharge system complies with applicable waste discharge requirements. The design and operational characteristics of the project related to water and wastewater would not incrementally or directly cause the City's systems to violate the applicable requirements. Therefore, this is a less than significant impact.

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The project site lies within the Kings Groundwater Subbasin, a hydrologic region that includes portions of Fresno, Tulare and Kings Counties and is part of the larger San Joaquin Valley Groundwater Basin. The Kings Subbasin is critically overdrafted.

The City of Fresno obtains its water supply from a combination of groundwater, surface water entitlements, and recycled water. While historically the City of Fresno relied entirely on groundwater for its water supply, according to the City's 2015 Urban Water Management Plan, it will have transitioned to a supply comprised of about 46 percent groundwater, 50 percent surface water, and 4 percent recycled water in the Year 2020 (City of Fresno UMWP, p. 7-13). Although the City has transitioned toward increasing surface water supplies and implementing measures to promote groundwater conservation and recharge, groundwater is likely to remain a major source of the City's water supply.

The water demand for the project demand for the project is not expected to significantly differ from the mixed-use and residential land use designations planned for the site in the City of Fresno General Plan. Generally, educational facilities and office buildings generate less overall demand for water than residential uses. Additionally, the facilities proposed as part of project would not include features that require significant amounts of water for irrigation (e.g. large turfed areas for athletics and recreation), thus reducing the project's demand for water. Further, the project's potential impact specifically to groundwater supplies would be lessened because the City has adopted policies and developed facilities to increase utilization of surface water and recycled water while reducing or holding constant its use of groundwater to meet future water demands within the City's service area. Regarding groundwater recharge, the existing project site is generally developed with buildings, roads, and other impermeable surfaces. As such, the construction and redevelopment of project-related facilities on the site would not substantially change groundwater recharge conditions at the site from existing conditions. For these reasons, the project would have a less than significant impact on groundwater supplies and recharge.

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. Result in substantial erosion or siltation on- or off-site;

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

iv. Impede or redirect flood flows?

No streams or rivers exist on the project site. Grading required for the proposed project would change the existing drainage pattern within the project site, and the additional covered surfaces would increase the amount of surface runoff and, potentially, the rate of runoff. The runoff would have the potential to degrade surface and groundwater quality if not properly controlled.

The Fresno Metropolitan Flood Control District (FMFCD) is responsible for managing urban stormwater runoff within the greater Fresno area. Its local urban system for storm water drainage consists of storm drains, detention and retention basins, and pump stations. The system is designed to retain and infiltrate as much stormwater and urban runoff as possible. FMFCD's Storm Drainage and Flood Control Master Plan includes 158 drainage areas, each providing service to approximately one to two square miles. All but five of the developed drainage areas are served by a retention or detention facility.

In response to the NOP prepared for the project, FMFCD provided a comment letter indicating that the FMFCD Master Plan storm drainage system for the area is complete, that the system was designed for land use densities designated on prior General Plans and have been reflected in the FMFCD Master Plan, and that any proposed densification of existing land use densities within the plan area may exceed the capacity of the existing system and will require FMFCD review and approval prior to implementation. The volume of stormwater runoff from the proposed project would not substantially differ than what would occur with the urban residential, mixed-use, and public institutional development the *2014 Fresno General Plan* designates for the site. The portion of the project area located on the existing FCC campus (i.e. the majority of the entire project area) consists almost entirely of impermeable surfaces. For the proposed expansion areas, the City of Fresno's land use designations (Neighborhood Mixed Use and Medium-High Density Residential) also entail development that would include to a high degree land covered with impermeable surfaces (e.g., building pads, streets, sidewalks, driveways), to which the proposed project facilities would likely be substantially similar. However, to the extent that projected runoff from proposed project development exceeds the capacity of the existing storm drainage system, mitigation will be required in the form of on-site retention or FMFCD system modifications, which must be reviewed and approved by FMFCD prior to implementation.

Additionally, SCCCD must comply with FMFCD requirements for the design, construction, and operation of on- and off-site stormwater improvements necessary to serve the project. Before beginning construction, SCCCD must prepare a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP is a site-specific plan that is designed to control the discharge of pollutants from the construction site to local storm drains and waterways. FMFCD is responsible to ensure Permit compliance within the boundaries of the area's National Pollutant Discharge Elimination System (NPDES) Permit boundary. FMFCD's focus is on ensuring that construction sites are managed to minimize the amount of sediment discharged off-site and into the local storm drain system.

Based on the above information, including compliance with applicable requirements pertaining to drainage and stormwater runoff, the impacts of the project would be less than significant, with the inclusion of the following mitigation measure.

Mitigation Measure HW-1: Mitigation for Potential Increase in Stormwater Runoff

To the extent that projected runoff from proposed project development exceeds the capacity of the existing storm drainage system, mitigation will be required in the form of on-site retention or FMFCD system modifications, which must be reviewed and approved by FMFCD prior to implementation.

Level of Significance After Mitigation: With implementation of the recommended mitigation measure, potential impacts related to stormwater runoff will be less than significant.

d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No impact would result as project site is not located in a flood hazard, tsunami, or seiche zone.

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The Sustainable Groundwater Management Act (SGMA) was signed into law in 2014 to remedy unsustainable groundwater depletion in groundwater basins in California. SGMA requires the development and adoption of Groundwater Sustainability Plans (GSPs) by 2020 and that all high and medium priority groundwater basins (including the Kings Sub-basin) must reach sustainability by 2040. SGMA gives local agencies the authorities to manage groundwater in a sustainable manner and allows for limited state intervention when necessary to protect groundwater resources.

The City of Fresno is participating with other local agencies in the North Kings Groundwater Sustainability Agency (North Kings GSA), a joint powers agency formed in December 2016 to implement SGMA for a northern portion of the Kings Subbasin. The North Kings GSA, consistent with SGMA, is developing a GSP targeted for completion before the legislated deadline of January 31, 2020. This document will be developed in compliance with the California Department of Water Resources' Groundwater Sustainability Plan Emergency Regulations. Developed pursuant to Water Code Section 10733.2, the regulations describe the components of groundwater sustainability plans, intra-basin coordination agreements, and the methods and criteria to be used by DWR to evaluate those plans and coordination agreements.

As discussed above in Section 6.10(b), the proposed parking structure, Science Building, and other facilities included as part of the project are not expected to adversely affect groundwater supplies or recharge. As such, the project is not expected to conflict with or obstruct the GSP ultimately adopted by the North Kings GSA. No other potential conflicts pertaining to water quality planning and/or groundwater management have been identified.

6.11 Land Use and Planning

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Physically divide an established community?			✓	
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?			✓	

Would the project:

a. Physically divide an established community?

The project would not cause a physical division of an established community. Development of the Science Building, parking structure, new Child Development Center, and new Maintenance & Operations Building would be contiguous with the existing community college campus, and the buildout would result in consistent linear campus boundaries along the west side of Blackstone Avenue and the south side of Cambridge Avenue. Development of the parking and storage area for the proposed Maintenance & Operations Building would encroach approximately 185 feet beyond the existing northernmost area of the campus (currently, the south side of Yale Avenue) into a relatively small area immediately adjacent to the BNSF railroad tracks. The size, location, and operational nature of the parking and storage area for the proposed Maintenance & Operations Building would not cause any residential parcels to be isolated, nor would it cause a new or substantially increased physical division of a community.

b. Conflict with any land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

As discussed in Section 2.4 of this Initial Study, the project site includes land designated by the City of Fresno for Public Facilities, Neighborhood Mixed Use, and Medium High Density Residential with zoning that corresponds with these designations (i.e. "PI" for Public Facilities, "NMX" for Neighborhood Mixed Use, and "RM-1" for Medium High Density Residential). For each of these zone districts, the Development Code lists "Colleges and Trade Schools" as either permissible or conditionally permissible uses. The proposed project, by building out improved community college facilities in a densified urban form and conducive of greater activity along a key transportation and development corridor, is consistent with the policies and overall intent of both the Public Facilities and Neighborhood Mixed Use designations. Also, given the mix of adjacent land use designations and history of development at the project site vicinity, development of campus-serving maintenance and operational facilities on the portion of the site designated Medium High Density Residential would not undermine the overarching intent of the designation; the non-residential uses provided for in the Development Code illustrate how the underlying land use designation is designed to "fit in" with other forms of surrounding development.

The project also aligns with several of the City's broader planning goals and objectives, such as supporting infill development and forming Activity Centers that promote pedestrian and transit access. The project particularly would function to forward the City's vision to add activity and uses along the Blackstone Avenue Corridor, Regarding the Tower District Specific Plan, the proposed parking structure directly addresses the longstanding issue of parking from the campus spilling over into residential neighborhoods. Additionally, the project would develop new facilities consistent with the planning laid out in FCC's Educational Master Plan and SCCCD's Facilities Master Plan. Further, this Initial Study demonstrates that all potential impacts of the project are either less than significant or can be mitigated to a less than significant impact.

6.12 Mineral Resources

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				✓
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				✓

Would the project:

a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

The project would have no impacts on known mineral resources. The project site is located in a highly urbanized area and would not result in the loss of availability of a known mineral resource because no known resources exist on or near the proposed site. Likewise, the project would not result in the loss of availability of a locally important mineral resource recovery site because none exists on or near the site (Fresno County General Plan Background Report (2000), City of Fresno General Plan DEIR (2014)).

b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

This impact is addressed in Section 6.12(a) above.

6.13 Noise

This section is based on the Noise & Groundborne Vibration Impact Analysis prepared for the project, included as Appendix 5 of this Initial Study.

Would the project result in:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		✓		
b. Generation of excessive groundborne vibration or groundborne noise levels?			✓	
c. For a project located within a private airstrip or airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				✓

Would the project result in:

a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Noise generated by the proposed project would occur during short-term construction and long-term operation. Noise-related impacts associated with short-term construction and long-term operations of the proposed project are discussed separately, as follows:

Short-Term Construction Noise Levels

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading and excavation, erection) of construction. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Although noise ranges were found to be similar for all construction phases, the initial site preparation phases, including demolition and grading/excavation activities, tend to involve the most equipment and result in the highest average-hourly noise levels.

Noise levels commonly associated with construction equipment are summarized in the Noise & Groundborne Vibration Impact Analysis (see Appendix 5, Table 7). As noted there, instantaneous noise levels (in dBA L_{max}) generated by individual pieces of construction equipment typically range from approximately 80 dBA to 85 dBA L_{max} at 50 feet (FTA 2006). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Average-hourly noise levels for individual equipment generally range from approximately 73 to 82 dBA $L_{eq.}$ Based on typical off-road equipment usage rates and assuming multiple pieces of equipment operating simultaneously within a localized area, such as soil excavation activities, average-hourly noise levels could reach levels of approximately 80 dBA L_{eq} at roughly 100 feet.

The City of Fresno has not adopted noise standards that apply to short-term construction activities. However, based on screening noise criteria commonly recommended by federal agencies, construction activities would generally be considered to have a potentially significant impact if average-hourly daytime noise levels would exceed 80 dBA L_{eq} at noise-sensitive land uses, such as residential land uses (FTA 2006). Depending on the location and types of activities conducted (e.g., building demolition, soil excavation, grading), predicted noise levels at the nearest residences, which are located adjacent to and west of the project site, could potentially exceed 80 dBA L_{eq}. Furthermore, with regard to residential land uses, activities occurring during the more noise-sensitive evening and nighttime hours could result in increased levels of annoyance and potential sleep disruption. For these reasons, noise-generating construction activities would be considered to have a potentially significant short-term noise impact.

Mitigation Measure N-1: Reduction of Construction-Generated Noise Levels

The following measures shall be implemented to reduce construction-generated noise levels.

a. Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 10:00 p.m. Construction activities shall be prohibited on Sundays and legal holidays. Construction truck trips shall be scheduled, to the extent feasible, to occur during non-peak hours and truck haul routes shall be selected to minimize impacts to nearby residential dwellings.

b. Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

c. Stationary construction equipment (e.g., portable power generators) should be located at the furthest distance possible from nearby residences. If deemed necessary, portable noise barriers shall be erected sufficient to shield nearby residences from direct line-of-sight of stationary construction equipment.

d. When not in use, all equipment shall be turned off and shall not be allowed to idle. Clear signage shall be provided that posts this requirement for workers at the entrances to the site.

Level of Significance After Mitigation: Use of mufflers would reduce individual equipment noise levels by approximately 10 dBA. Implementation of the above mitigation measures would limit construction activities to the less noise-sensitive periods of the day. With implementation of the above mitigation measures, this impact would be considered less than significant.

Long-term Operational Noise Levels

Potential long-term increases in noise associated with the proposed project would be primarily associated with the operation of building equipment, such as heating, ventilation, and air conditioning (HVAC) units, outdoor recreational activities, and vehicle use within onsite parking lots.

Maintenance & Operations Facilities

The proposed project includes the construction of maintenance and operations facilities, to be located adjacent to and west of N. San Pablo Avenue, north of E. Cambridge Avenue. Noise generated by the maintenance and operations facilities would be primarily associated with the installation of an air compressor. Additional sources of noise may include the use of pneumatic tools within the automotive shop area. Noise levels commonly associated with air compressors typically average approximately 76 dBA L_{eq} at 50 feet. Pneumatic tools can generate noise levels of approximately 82 dBA L_{eq} at 50 feet, with intermittent noise levels reaching approximately 85 dBA L_{max} at 50 feet. Based on the preliminary plans prepared for the project, the air compressor would be enclosed and shielded from direct line-of-sight of the nearest residential land uses by intervening buildings. The automotive service bay would, likewise, be shielded from the nearest residential land uses by intervening onsite structures. Based on the operational noise levels noted above and assuming 15-dB reductions for the air compressor enclosure and intervening structures, combined operational noise levels would be approximately 54 dBA L_{eq} at the property line of residential uses located to the north, across E. Yale Avenue, and approximately 48 dBA L_{eq} at the property line of residential uses located to the east, across N. San Pablo Avenue. Predicted operational noise levels would exceed the City's daytime and nighttime noise standards (i.e., 50 and 45 dBA L_{eq}) at the property line of residential land uses to the north, and the City's nighttime noise standard at the property line of residential land uses to the east. Maximum instantaneous noise levels associated with the use of pneumatic tools would be approximately 67 dBA L_{max} at the nearest residential property line, which would exceed the City's nighttime noise standard of 65 dBA L_{max}. As a result, this impact would be considered potentially significant.

Building Maintenance and Mechanical Equipment

Proposed structures, including the proposed Maintenance & Operations Building, Child Development Center, Science Building, and parking structure would be anticipated to include the use of building mechanical equipment, such as air conditioning units and exhaust fans.

The specific building mechanical equipment to be installed and the locations of such equipment have not yet been identified. Building mechanical equipment (e.g., air conditioning units, exhaust fans) would typically be located within the structures, enclosed, or placed on rooftop areas away from direct public exposure. Exterior air conditioning units and exhaust fans can generate noise levels up to approximately 65 dBA L_{eq} at 10 feet. Depending on type and location of onsite equipment, predicted operational noise levels at nearby residential land uses could exceed the City's applicable exterior daytime and nighttime noise standards of 50 and 45 dBA L_{eq}, respectively (refer to Table 3 of Appendix 5).

In addition to building mechanical equipment operations, landscape maintenance and waste collection activities may also result in significant increases in ambient noise levels at nearby residential land uses, particularly if such activities were to occur during the more noise-sensitive nighttime hours. As a result, noise generated by onsite building maintenance and mechanical equipment would be considered to have a potentially significant impact.

Recreational Facilities

The proposed project includes the construction of a new Child Development Center, which would be anticipated to include outdoor recreational-use facilities, such as playgrounds. Noise generated by small playgrounds typically includes elevated children's voices and occasional adult voices. Based on measurement data obtained from similar land uses, noise levels associated with small playgrounds can generate intermittent noise levels of approximately 55-60 dBA L_{eq} at 50 feet. The proposed Child Development Center would be constructed in the same general location of the existing Child Development Center. As a result, operational noise levels associated with exterior recreational facilities would be similar to noise levels associated recreational facilities at the existing use. As a result, significant increases in ambient noise levels would not be anticipated to occur. In addition, no noise-sensitive land uses were identified in the vicinity of the proposed Child Development Center that would be adversely affected by outdoor recreational noise events. Noise generated by recreational facilities would be considered to have a less than significant impact.

Vehicle Parking Areas & Structures

The proposed project includes the construction of a parking structure with capacity for up to 1,000 spaces, as well as various surface parking areas. The parking structure would be located east of N. Glenn Avenue, between E. Cambridge Avenue and E. Weldon Avenue. Table 6.13-A summarizes the predicted operational noise levels for the proposed parking structure. Based on a conservative assumption that all parking spaces within the parking structure were to be accessed over a one-hour period, predicted daytime noise levels at the property line of the nearest residential dwellings (which are located adjacent to and north of E. Cambridge Avenue) would be 47 dBA L_{eq}. During the nighttime hours, when student attendance is less, predicted parking garage noise levels are estimated to average approximately 41 dBA L_{eq}, or less. Predicted operational noise levels associated with other smaller surface parking areas would be less. During the daytime hours, predicted operational noise levels would be largely masked by ambient noise levels, which generally range from the low to mid 50s (in dBA L_{eq}) and are predominantly influenced by vehicle traffic noise on area roadways. Predicted noise levels would not exceed the City's daytime or nighttime noise standards of 50 and 45 dBA L_{eq}, respectively. As a result, this is considered a less than significant impact.

Table 6.13-A
Predicted Parking Structure Operational Noise Levels

Day of Week/Period of Day	Noise Level at the Nearest Residential Property Line (dBA L_{eq})	Exceeds Standards/ Significant Impact?[1]
Weekday – Daytime (7:00 a.m. to 10:00 p.m.)[2]	47	No
Weekday – Nighttime (10:00 p.m. to 7:00 a.m.)[3]	41	No
Saturday – Daytime (7:00 a.m. to 10:00 p.m.)[4]	36	No

Noise levels associated with vehicle parking areas were calculated in accordance with FHWA's Transit Noise and Vibration Impact Assessment Guidelines (2006).

1. The City of Fresno's daytime and nighttime noise standards are 50 and 45 dBA L_{eq}, respectively, applied at outdoor activity areas. To be conservative, predicted noise levels were calculated at the property line of the nearest residential land uses.

2. Based on the total capacity of the parking garage (1,000 spaces) and assuming that all parking spaces could be accessed over a one-hour period.

3. Based on the highest hourly on-campus student attendance for the evening hours (7:00 p.m. to 10:00 p.m.) of 301 students and assuming that all students would utilize the parking garage and depart the structure after 10:00 p.m. Based on student attendance data, hourly on-campus student attendance/parking garage use for the early morning hours (5:00 a.m. to 7:00 a.m.) would be less.

4. Based on the highest hourly on-campus student attendance of 93 students and assuming that all students would utilize the parking garage and depart the structure over a one-hour period. Based on student attendance data, use of the parking garage during Saturday nighttime hours and Sundays would be less.

Source: Ambient 2019. Refer to the Noise & Groundborne Vibration Impact Analysis (Initial Study Appendix 5) for modeling results and assumptions.

Roadway Traffic

Predicted existing traffic noise levels, with and without implementation of proposed project, are summarized in Table 6.13-B. In comparison to existing traffic noise levels, the proposed project would result in a predicted increase in traffic noise levels of 0.3 to 4.6 along area roadways.

Predicted increases in future cumulative traffic noise levels along nearby roadways for proposed project are summarized in Table 6.13-C. In future years, the project's contribution to cumulative traffic noise levels would be anticipated to decline slightly as increases in vehicle traffic due to surrounding development increases. Under future cumulative conditions, the proposed project would result in predicted increases in traffic noise levels of 0.3 to 4.5 along area roadways.

As noted earlier in this report, changes in ambient noise levels of approximately 3 dBA, or less, are typically not discernible to the human ear and would not be considered to result in a significant impact. Implementation of the proposed project would result in a significant increase (i.e., 3 dBA, or greater) in existing and projected future traffic noise levels along E. Cambridge Avenue, west of N. Blackstone Avenue. However, predicted traffic noise levels along this roadway segment would not be projected to exceed the City's exterior noise standard of 65 dBA CNEL at adjacent residential land uses. As a result, this impact would be considered less than significant.

Table 6.13-B
Predicted Increases in Existing Traffic Noise Levels

Roadway Segment	Predicted Noise Level at 50 feet from Centerline of Near Travel Lane (dBA CNEL/Ldn)[1]			
	Existing Without Project	Existing With Project	Difference[2]	Significant Impact?[3]
N. San Pablo Ave., South of E. Clinton Ave.	48.7	50.3	1.6	No
N. Glenn Ave., South of E. Clinton Ave.	51.6	52.9	1.3	No
E. Cambridge Ave., West of Blackstone Ave.	50.1	54.7	4.6	No
N. Blackstone Ave., South of E. Cambridge Ave.	66.4	66.8	0.3	No

1. Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108), based on data obtained from the traffic analysis prepared for this project.
2. Difference in noise levels reflects the incremental increase attributable to the proposed project.
3. Defined as a substantial increase in ambient noise levels in excess of the City's exterior noise standard of 65 dBA CNEL.
Source: Ambient 2019. Refer to the Noise & Groundborne Vibration Impact Analysis (Initial Study Appendix 5) for modeling results and assumptions.

Table 6.13-C
Predicted Increases in Future Traffic Noise Levels

Roadway Segment	Predicted Noise Level at 50 feet from Centerline of Near Travel Lane (dBA CNEL/Ldn)[1]			
	Existing Without Project	Existing With Project	Difference[2]	Significant Impact?[3]
N. San Pablo Ave., South of E. Clinton Ave.	48.7	50.3	1.6	No
N. Glenn Ave., South of E. Clinton Ave.	51.7	53.0	1.3	No
E. Cambridge Ave., West of Blackstone Ave.	50.2	54.7	4.5	No
N. Blackstone Ave., South of E. Cambridge Ave.	67.2	67.5	0.3	No

1. Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108), based on data obtained from the traffic analysis prepared for this project.
2. Difference in noise levels reflects the incremental increase attributable to the proposed project.
3. Defined as a substantial increase in ambient noise levels in excess of the City's exterior noise standard of 65 dBA CNEL.
Source: Ambient 2019. Refer to the Noise & Groundborne Vibration Impact Analysis (Initial Study Appendix 5) for modeling results and assumptions.

Land Use Compatibility

The Noise Element of the *2014 Fresno General Plan* includes noise standards for determination of land use compatibility for new land uses. As previously discussed, the City's "normally acceptable" exterior noise standards for schools is 65 dBA CNEL/L_{dn}.

As noted earlier in this report, ambient noise levels in the project area are largely influenced by traffic noise on area roadways. Under future cumulative conditions, with project-generated vehicle traffic included, the predicted 65 dBA CNEL/L_{dn} noise contour for N. Blackstone Avenue would extend to 129 feet from the roadway centerline. Based on preliminary site plans, the proposed Science Building would be located approximately 85 feet from the centerline of N. Blackstone Avenue. Based on this setback distance, predicted traffic noise levels at the nearest building façade would be 68 dBA CNEL/L_{dn}. With compliance with current building insulation standards, average exterior-to-interior noise reductions for newly constructed buildings typically range from approximately 25-30 dB. Assuming an exterior noise level of 68 dBA CNEL/L_{dn} and a minimum exterior-to-interior noise reduction of 25 dB, predicted interior noise levels within the proposed Science Building would be approximately 43 dBA CNEL/L_{dn}, or less. Predicted interior noise levels would not exceed the City's applicable interior noise standard of 45 dBA CNEL/L_{dn}. The projected 65 dBA CNEL contour for other area roadways, including E. University Avenue and N. San Pablo Avenue, are not projected to extend beyond the roadway right-of-way. As a result, other proposed land uses, including the proposed Child Development Center and maintenance and operations facilities, would not be projected to exceed applicable City noise standards for land use compatibility. As a result, this impact would be considered less than significant.

Mitigation Measure N-2: Reduction of Long-Term Operational Noise Impacts

The following measures shall be implemented to reduce long-term operational noise impacts of the project:

a. An acoustical analysis shall be prepared for proposed onsite buildings and facilities prior to final design of the project's proposed facilities. The purpose of the acoustical analysis will be to evaluate operational noise levels associated with on-site building mechanical equipment (e.g. air conditioning units, exhaust fans) in comparison to applicable City of Fresno exterior daytime and nighttime noise standards of 50 and 45 dBA L_{eq}. The acoustical analysis shall identify nose-reduction measures to be incorporated, if needed, that are sufficient to achieve applicable noise standards. Noise-reduction measures to be incorporated may include, but are not limited to, the selection of alternative or quieter equipment, use of equipment enclosures, site design, and construction of noise barriers (e.g. walls).

b. Operation of the proposed Maintenance & Operations Building shall be limited to between the hours of 7:00 a.m. and 10:00 p.m.

c. Stationary equipment (e.g. air compressors) to be located at the proposed Maintenance & Operations Building shall be enclosed and shielded from direct line-of-sight of nearby residential land uses.

d. Exterior doors of the automotive service bay located within the proposed Maintenance & Operations Building shall be closed when using noise-generating equipment (e.g. pneumatic tools).

e. Landscape maintenance and waste collection activities shall be limited to between the hours of 7:00 a.m. and 10:00 p.m.

f. Any stationary equipment (e.g. air compressors) to be installed at the proposed Maintenance & Operations Building shall be enclosed, located at the furthest feasible distance from nearby residential land uses, and shielded from direct line-of-sight of nearby residential land uses.

Level of Significance After Mitigation: Implementation of Mitigation Measure N-2 would limit on-site maintenance activities, including activities conducted at the proposed maintenance facilities, landscape maintenance, and waste collection activities, to daytime hours of operation. Additional measures have been included to further reduce operational noise levels associated with the proposed Maintenance & Operations facilities. With mitigation, predicted noise levels associated with operation of the proposed Maintenance & Operations facilities would be reduced to 49 dBA L_{eq}, or less, at the nearest residential property lines. In addition, an acoustical analysis would also be required prior to final site design to further evaluate noise levels associated with building mechanical equipment (e.g., exhaust fans, air conditioning units) and to incorporate additional mitigation sufficient to achieve applicable City of Fresno noise standards. With mitigation, noise impacts associated with on-site non-transportation noise sources would be considered less than significant.

b. Generation of excessive groundborne vibration or groundborne noise levels?

Long-term operational activities associated with the proposed project would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration. Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with short-term construction-related activities. Construction activities associated with the proposed improvements would likely require the use of various off-road equipment, such as tractors, concrete mixers, and haul trucks. The use of major groundborne vibration-generating construction equipment, such as pile drivers, would not be required for this project.

Per the Noise & Groundborne Vibration Impact Analysis (see p. 19 of Initial Study Appendix 5), groundborne vibration levels associated with representative construction equipment would range from approximately 0.003 to 0.089 in/sec ppv at 25 feet. These predicted vibration levels at the nearest existing structures would not be anticipated to exceed commonly applied criteria for structural damage or human annoyance (i.e., 0.5 and 0.2 in/sec ppv, respectively). In addition, no fragile or historic structures have been identified in the project area. As a result, this impact would be considered less than significant.

c. For a project located within a private airstrip or airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No impact would occur. The nearest airports in the project vicinity include the Fresno Yosemite International Airport and the Fresno Chandler Downtown Airport, which are located approximately 3.1 and 2.6 miles to the east and southwest, respectively. The proposed project is not located within the projected 60 dBA CNEL/L_{dn} noise contours of these airports (City of Fresno 2014). No private airstrips were identified within two miles of the project site.

6.14 Population and Housing

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Induce substantial unplanned population growth either in an area, directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			✓	
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?			✓	

Would the project:

a. Induce substantial unplanned population growth either in an area, directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

The FCC campus has existed in its current location for several decades, and the proposed project would entail a continuation of the use and operation of the campus in a manner similar to that of the existing campus. The project is intended to primarily address existing facilities capacity issues at the campus, and as such much of the project's service population is already present at the site. The project site is in a highly urbanized area, so no extension of infrastructure to previously unserved areas would be required for the project. Additionally, as discussed in Section 6.11, the City of Fresno has adopted policies to promote infill development and revitalization in established areas of the city, with specific attention given to the Blackstone Avenue corridor and the vicinity of Fresno City College. The project is also located along an existing major FAX bus line, and bike lanes and sidewalks exist at the northern boundary of the site, thus making the site readily accessible via alternative modes of transportation. Any growth in the area induced by the project would be consistent with the growth anticipated in, and sought after by, City plans and policies. Therefore, this impact is less than significant.

b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

Development of the project entails removal of one duplex on the south side of Cambridge Avenue to accommodate the proposed parking structure, and a second vacant duplex north of Yale Avenue near the BNSF railroad tracks to accommodate the proposed Maintenance & Operations Building's parking and storage area.

The project would not displace either people or housing at an amount that necessitates construction of replacement housing. The project is subject to compliance with state housing and relocation laws and regulations, which require SCCCD to provide compensation and relocation assistance to property owners and tenants (i.e. the California Relocation Assistance Law [Cal. Gov. Code § 7260 et seq.], and the California Relocation Assistance and Real Property Acquisition Guidelines [Title 25 CCR, Chapter 6, § 6000 et seq.). Further, the number of residents and housing units that would be displaced as a result of the project is of a quantity that can be accommodated by vacancies in the existing local area housing supply. For these reasons, this impact is considered less than significant.

6.15 Public Services

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities or need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any				

of the following public services:				
(i) Fire Protection?			✓	
(ii) Police Protection?			✓	
(iii) Schools?			✓	
(iv) Parks?			✓	
(v) Other public facilities?			✓	

Would the project:

a. Result in substantial adverse physical impacts associated with the provision of new or altered governmental facilities, need for new or altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services: (i) fire protection, (ii) police protection, (iii) schools, (iii) parks, (v) other public facilities?

The project would not result in the need for new or physically altered fire protection, police protection, schools, parks, other public facilities in order to maintain acceptable service ratios, response times, or other performance objectives. The project site is situated at the existing Fresno City College campus within an area of existing urban development where City of Fresno facilities and services are already available and provided, so the project would not require expansion of service areas. Neither the build-up of new facilities nor potential net increase in student and employee populations would substantially adversely impact public service performance measures. Regarding police protection, SCCCD provides police protection services for the FCC campus, and the project would entail relocation of the SCCCD police department from its existing location to another existing building on campus. However, this change is not expected to result in any substantially adverse impacts to the departments service or performance, nor will the relocation result in any specific physical environmental impacts. Additionally, the project entails an expansion of public community college facilities, with objectives of improving the capacity and efficacy of public higher education opportunities offered by Fresno City College. Based on these factors, impacts to public services would be considered less than significant.

6.16 Recreation

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			✓	
b. Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?			✓	

Would the project:

a. Increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

The proposed project would not result in substantial physical deterioration of existing parks and/or recreational facilities. As the project would primarily accommodate the existing population of Fresno City College students and employees, it is not expected to substantially increase the demand for or use of existing park and recreation facilities. This impact is thus considered less than significant.

b. Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

Development of the proposed Child Development Center may include minor recreation areas to be used by children at the center. Potential impacts specifically attributable to this component of the Child Development Center (e.g. noise) have been determined to be less than significant in this Initial Study. No other new recreational facilities or modifications to existing recreational facilities are included as part of the project, nor would any construction or expansion of recreational be required as a result of the project.

6.17 Transportation

The discussion of transportation and traffic impacts in this section primarily reflects information in the Traffic Impact Analysis (TIA) prepared for the project by JLB Traffic Engineering, Inc. (Initial Study Appendix 6).

Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?		✓		
b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				✓
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		✓		
d. Result in inadequate emergency access?			✓	

Table 6.17-A provides definitions for traffic-related terms used in this section.

TABLE 6.17-A
Transportation/Traffic Definitions and Standards

Roadway Categories

- Expressways: Expressways provide for through traffic movement on continuous routes through a city. It generally connects with arterials, highways, freeways. Also, it connects a city with other cities. Expressways are generally four lane roadways, divided and undivided. Access to expressways is typically restricted to signalized intersections with arterial and collector streets. There are no expressways in the vicinity of this project.
- Arterials: Arterials are designed to move large volumes of traffic and are intended to provide a high level of mobility between freeways, expressways, other arterials, and collector roadways. Arterials also provide non-freeway/highway connections between major residential, employment, and activity centers. Unlike freeways, they are intended not only for motor vehicles, but also for bicycles and pedestrians. Arterial streets typically have more right-of-way and a higher degree of access control than collector roadways.
- Collectors: Collector streets provide for relatively short distance travel between and within neighborhoods. Collectors are not designed to handle long-distance through-traffic. Driveway access to collectors is less limited than on arterials. Speed limits on these streets are typically lower than those found on arterials.
- Local Streets: Local streets are designed to provide direct roadway access to abutting land uses and serve short distance trips within neighborhoods. Traffic volumes and speed limits on local streets are low, and these roadways have no more than two travel lanes.

Level of Service

Level of Service (LOS) is a measure of roadway performance based on a qualitative description of traffic flow from the perspective of motorists. The Highway Capacity Manual (HCM) developed by the Transportation Research Board defines the following six levels of service from LOS A to LOS F. These grades represent the perspective of drivers only and are an indication of the comfort and convenience associated with driving, as well as speed, travel time, traffic interruptions, and freedom to maneuver.

- Level of Service A: Free-flow operations. Drivers are almost completely unimpeded in their ability to maneuver within the traffic stream.
- Level of Service B: Free-flow speeds are maintained. The ability to maneuver within the traffic stream is only slightly restricted.
- Level of Service C: Traffic flow with speeds at or near free-flow speed. The freedom to maneuver within the traffic steam is noticeably restricted, and lane changes require more care and vigilance on the part of the driver.
- Level of Service D: Speeds begin to decline slightly with increasing flows. Freedom to maneuver within the traffic stream is noticeably limited.
- Level of Service E: Operations at or near capacity. There are virtually no useable gaps within the traffic stream, leaving little room to maneuver.
- Level of Service F: Breakdown in vehicular flow. Vehicular demand exceeds capacity. (Fehr and Peers 2014)

AM Peak Hour/PM Peak Hour

For purposes of this Initial Study:

- AM Peak Hour (or morning peak hour) means the average vehicle trip ends versus dwelling units for residential units and students for elementary schools on a weekday (Tuesday, Wednesday or Thursday only), peak hour of adjacent street traffic, one hour between 7 and 9 a.m.

• PM Peak Hour (or evening peak hour) means the average vehicle trip ends versus dwelling units for residential units and students for elementary schools on a weekday (Tuesday, Wednesday or Thursday only), peak hour of adjacent street traffic, one hour between 2 and 4 p.m.
Vehicle Miles Traveled
Vehicle Miles Traveled (VMT) refers to the amount and distance of automobile travel attributable to a project. Calculating VMT simply involves the product of a number of trips and those trips' lengths. The first step in a VMT analysis is to establish the baseline average VMT, which requires the definition of a region. The OPR Technical Advisory states that existing VMT may be measured at the regional or city level. On the contrary, the Technical Advisory also notes that VMT analyses should not be truncated due to "jurisdictional or other boundaries."

Would the project:

a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

<u>Criteria of Significance</u>

City of Fresno – Level of Service

The City of Fresno General Plan has established various degrees of acceptable LOS on its major streets, which are dependent on four (4) Traffic Impact Zones (TIZs) within the City of Fresno. The standard LOS threshold for TIZ I is LOS F, that for TIZ II is LOS E, that for TIZ III is LOS D, and that for TIZ IV is LOS E. Additionally, the General Plan Master EIR made findings of overriding consideration to allow a lower LOS threshold that that established by the underlying TIZ. For those cases in which a LOS criterion for a roadway segment differs from that of the underlying TIZ, such criteria are identified in the roadway description. In this case, all study facilities, except for the southern leg of the intersection of Cedar Avenue and Butler Avenue, fall within TIZ I, therefore LOS F is used to evaluate the potential significance of LOS impacts to intersections within TIZ I. Since the southern leg of the intersection of Cedar Avenue and Butler Avenue falls within TIZ II, LOS E is used to evaluate the potential significance of LOS impacts to this particular intersection.

(Note: As mentioned in the Traffic Impact Analysis, the County of Fresno and Caltrans each have independent measures for acceptable Level of Service, but the agencies' standards are not necessarily applicable based on locational factors. In this case, all study facilities fall within the City of Fresno, thus the City of Fresno LOS thresholds are utilized.)

City of Fresno Active Transportation Plan

The City of Fresno's Active Transportation Plan (ATP) is a comprehensive guide outlining the vision for active transportation in the City and a roadmap for achieving that vision. Active transportation is defined in the ATP as human-powered travel including walking, bicycling, and wheelchair use. The ATP strives to improve the accessibility and connectivity of the bicycle and pedestrian network in order to increase the number of persons that travel by active transportation and to provide walking and bicycling facilities equitably for all City residents. The following goals are set forth in the plan:

- Equitably improve the safety and perceived safety of walking and bicycling in Fresno
- Increase walking and bicycling trips in Fresno by creating user-friendly facilities
- Improve the geographic equity of access to walking and bicycling facilities in Fresno
- Fill key gaps in Fresno's walking and bicycling networks

To achieve these goals, the ATP proposes a long-term, comprehensive network of citywide bikeways, trails, and sidewalks that connect all parts of Fresno. Since build-out of this network will take many years to complete, the ATP also identifies a priority network of connected bikeways and priority pedestrian areas to focus the City's efforts in the near-term. These priority networks provide links to key destinations, support existing and future walking and biking activity areas, and equitably serve neighborhoods throughout the City. Additionally, the build-out must be consistent with requirements of the California Building Code and the Americans with Disabilities Act (ADA)[5].

Southern Blackstone Corridor Smart Mobility Strategy

Adopted in March 2019, the City of Fresno's Southern Blackstone Corridor Smart Mobility Strategy was developed to provide recommendations for both near-term and long-term multimodal and streetscape improvements for the City, private sector actors, longstanding institutions, and residents to consider and utilize in future planning and design as well as the implementation phase. In order to promote revitalization and transit-oriented development (TOD), the City changed the zoning along the Blackstone Avenue Corridor from auto-oriented commercial zoning designations to pedestrian-oriented mixed-use zoning, with the intention of transforming auto-oriented boulevards and corridors into vibrant, diverse, and attractive corridors that support a mix of pedestrian-oriented retail, office and residential uses in order to achieve an active social environment within a revitalize streetscape. To complement the envisioned land use changes and built environment, the multimodal improvements presented in the Strategy are intended to make the street safer and more comfortable to use for pedestrians, bicyclists, and transit riders; to improve non-motorized and transit-based access to shopping, services, and employment; improve air quality by reducing vehicle miles traveled (VMT); and to create a sense of place and identity for the street that residents and visitors alike can relate to. The Southern Blackstone Avenue Smart Mobility Strategy provides the City of Fresno with a community-driven vision and framework for implementing such a redesign and along with it many of the state, regional, and City policies and goals.

Senate Bill 743 – Transportation Impacts

Senate Bill (SB) 743 (Steinberg 2013) creates a path to revise the definition of transportation impacts according to CEQA. As the guidelines are proposed today, CEQA transportation impacts are determined using LOS of intersections and roadways, which is a measure of congestion. The intent of SB 743 is to align CEQA transportation study methodology with and promote the statewide goals and policies of reducing vehicle miles traveled (VMT) and greenhouse gases (GHG). Three objectives of SB 743 related to development are to reduce GHG, diversify land uses, and focus on creating a multimodal environment. It is hoped that this will spur infill development, particularly along transit corridors.

In December 2018, the California Natural Resources Agency certified and adopted the CEQA Guidelines update package, including the Guidelines section implementing SB 743 (section 15064.3). Concurrent with SB 743's implementation, the Governor's Office of Planning and Research (OPR) published its Technical Advisory on Evaluating Transportation Impacts in CEQA (hereafter referred to as "Technical Advisory"). The Technical Advisory acknowledges that lead agencies should set criteria and thresholds for VMT and transportation impacts. However, the Technical Advisory provides guidance to residential, office, and retail uses, citing these as the most common land uses. Beyond these three land uses, there is no guidance provided for any other land use type. The Technical Advisory also notes that land uses may have a less than significant impact if located within low VMT areas of a region. Screening maps are suggested for this determination.

Currently, Fresno COG and its member agencies, which include the City of Fresno, have begun the process to develop recommended criteria and thresholds that balance the direction from OPR and the goals of SB 743 with the vision of Fresno and economic development, access to goods and services, and overall quality of life.

[5] As described in the Fresno Active Transportation Plan, "The Americans with Disabilities Act Title III is legislation enacted in 1990 that provides thorough civil liberties protections to individuals with disabilities concerning employment, state and local government services, and access to public accommodations, transportation, and telecommunications. Title III of the Act requires places of public accommodation to be accessible and usable to all people, including those with disabilities. While the letter of the law applies to 'public accommodations,' the spirit of the law applies not only to public agencies but also to all facilities serving the public, whether publicly or privately funded."

However, these regional recommended criteria are not anticipated to be completed until mid-2020. In this Initial Study, a qualitative threshold of significance is utilized in conjunction with applicable LOS thresholds to evaluate the potential transportation impacts of the project.

Existing Transportation Conditions

Roadway Network

Following are descriptions of existing roadways in the vicinity of the project site:

- *San Pablo Avenue* is an existing north-south two-lane local street adjacent to the proposed project. In this area, San Pablo Avenue exists as a two-lane undivided local street between Clinton Avenue and Cambridge Avenue. The City of Fresno General Plan Circulation Element designates San Pablo Avenue as a two-lane local street between Clinton Avenue and Cambridge Avenue.
- *Glenn Avenue* is an existing north-south two-lane local street adjacent to the proposed project. In this area, Glenn Avenue exists as a two-lane undivided local street between Clinton Avenue and Cambridge Avenue. The City of Fresno General Plan Circulation Element designates Glenn Avenue as a two-lane local street between Clinton Avenue and Cambridge Avenue.
- *Blackstone Avenue* is an existing north-south six-lane divided arterial adjacent to the proposed project. In this area, Blackstone Avenue exists as a six-lane divided arterial between Nees Avenue and Hedges Avenue, and two one-way three-lane roadways (Blackstone Avenue and Abby Street) between Hedges Avenue and Divisadero Street. The City of Fresno General Plan Circulation Element designates Blackstone Avenue as a six-lane arterial between Nees Avenue and Hedges Avenue and a four-lane arterial between Hedges Avenue and Divisadero Street.
- *Clinton Avenue* is an existing east-west four-lane collector in the vicinity of the proposed project. In this area, Clinton Avenue exists west of Chestnut Avenue through the City of Fresno and east of Clovis Avenue through the City of Fresno. The City of Fresno General Plan Circulation Element designates Clinton Avenue predominantly as a four-lane collector through the City of Fresno.
- *Weldon Avenue* is an existing east-west two-lane local street adjacent to the proposed project. In this area, Weldon Avenue exists as a two-lane local street west of Blackstone Avenue. Weldon Avenue is the major access point to Fresno City College off of Blackstone Avenue. The City of Fresno General Plan Circulation Element designates Weldon Avenue as a local street west of Blackstone Avenue.
- *University Avenue* is an existing east-west two-lane local street adjacent to the proposed project. In this area, University Avenue exists a two-lane local street between Calaveras Street and Fresno Street. The City of Fresno General Plan Circulation Element designates University Avenue as a local street between Calaveras Street and Fresno Street.
- *McKinley Avenue* is an existing east-west four-lane divided arterial in the vicinity of the proposed project. In this area, McKinley Avenue exists predominantly as a four-lane arterial west of Clovis Avenue. The City of Fresno General Plan Circulation Element designates Clinton Avenue as a predominantly four-lane arterial west of Clovis Avenue.

  (Locational diagrams of the intersections and roadways studied as part of the Traffic Impact Analysis can be referenced in Appendix 6)

Transit

Fresno Area Express (FAX) is the transit operator in the City of Fresno. At present, there are five (5) FAX transit routes that operate in the vicinity of the proposed project. These include FAX Route 1 Q Bus Rapid Transit (BRT), FAX Route 39, FAX Route 28, FAX Route 45, and FAX Route 20. Retention of the existing routes and expansion of future routes is dependent on transit ridership demand and available funding.

FAX Route 1 Q BRT runs on Blackstone Avenue adjacent to the proposed project. Its nearest stop to the project is located along the west side of Blackstone Avenue approximately 150 feet south of Weldon Avenue. FAX Route 1 Q BRT operates at 10-minute intervals on weekdays starting at approximately 6:00 AM and ending at 9:00 AM, 15-minute intervals starting at approximately 9:00 AM and ending at approximately 2:35 PM, and 10-minute intervals starting at approximately 2:35 PM and ending at 7:00 PM. This route provides a direct connection to various destinations located along Blackstone Avenue and Ventura Avenue/Kings Canyon Road.

FAX Route 39 runs on Clinton Avenue approximately 0.14 miles north of the proposed project. Its nearest stop to the project is located along the south side of Clinton Avenue approximately 25 feet west of San Pablo Avenue. FAX Route 39 operates at 30-minute intervals on weekdays and weekends and provides a direct connection to Fresno High School, Fresno City College, Veterans Medical Center, the Fresno Art Museum, the Cedar-Clinton Library Branch, Alliant University, and Fresno Yosemite International Air Terminal.

FAX Route 28 runs on Van Ness Avenue/Maroa Avenue approximately 0.40 miles east of the proposed project. Its nearest stop to the project is located along the east side of Maroa Avenue approximately 40 feet south of Weldon Avenue. FAX Route 28 operates at 20-minute intervals on weekdays and weekends and provides a direct connection to Fashion Fair Shopping Center, Fresno State University, the Save Mart Center, Manchester Center, Fresno City College, Fresno High School, Community Regional Medical Center, the Fresno Convention Center, Chukchansi Park, and Chandler Downtown Airport.

FAX Route 45 runs on Van Ness Avenue/Maroa Avenue approximately 0.40 miles east of the proposed project. Its nearest stop to the project is located along the east side of Maroa Avenue approximately 40 feet south of Weldon Avenue. FAX Route 45 operates at 60-minute intervals on weekdays and weekends and provides a direct connection to Bullard High School, the Gillis Library Branch, Fresno High School, Fresno City College, Manchester Center, and the California Army National Guard Recruiting Office.

FAX Route 20 runs on Blackstone Avenue approximately 0.26 miles south of the proposed project. Its nearest stop to the project is located along the west side of Blackstone Avenue approximately 150 feet south of McKinley Avenue. FAX Route 20 operates at 30-minute intervals on weekdays and weekends and provides a direct connection to Lions Park, Fresno High School, Fresno City College, Ted C. Wills Community Center, Cesar E. Chavez Adult School, Fresno Community Hospital, and the Fresno Convention Center.

Bicycle and Pedestrian Facilities

Class II Bike Lanes currently exist in the vicinity of the proposed project site along McKinley Avenue. The City of Fresno Active Transportation Plan recommends that Class II Bike Lanes be implemented on 1) Clinton Avenue through the City of Fresno, and 2) McKinley Avenue through the City of Fresno.

Walkways exist in the vicinity of the project site along San Pablo Avenue, Glenn Avenue, Blackstone Avenue, Clinton Avenue, Cambridge Avenue, Weldon Avenue, University Avenue, and McKinley Avenue. The City of Fresno Active Transportation Plan recommends that walkways be implemented on: 1) San Pablo Avenue, 2) Glenn Avenue, 3) Blackstone Avenue, 4) Clinton Avenue, 5) Cambridge Avenue, 6) University Avenue, and 7) McKinley Avenue. Additionally, the Active Transportation Plan identifies Blackstone Avenue between Shaw Avenue and Divisadero Street as a Pedestrian Activity Area. Pedestrian Activity Areas are highlighted in the Active Transportation Plan because their existing or planned development patterns and land use result in higher levels of pedestrian activity; these areas are also noted as experiencing some of the highest frequency of pedestrian collisions. The Active Transportation Plan presents recommendations for enhancements will better support pedestrian activity and improve pedestrian safety, such as widening sidewalks, landscaping to provide shade, bulb-outs, crossing treatments, lighting, and traffic calming measures. Some of these enhancements also encourage slower traffic speeds, which if implemented will reduce the likelihood and severity of vehicle-pedestrian collisions.

Study Facilities

The study focused on evaluating traffic conditions at the existing study intersections that may potentially be impacted by the proposed project.

The majority of the existing peak hour turning movement volume counts were conducted at the study intersections in April 2019. Since the City of Fresno provided comments after the requested deadline of May 14, counts for the additional study intersections were not collected until early June 2019. It is noted that while most schools in the vicinity of the proposed Project were in session, Fresno City College was out for summer break. Therefore, any counts collected in June were prorated upward to closely match upstream and downstream traffic counts collected while all schools in the vicinity of the project were in session. The intersection turning movement counts included pedestrian and bicycle volumes. The traffic counts for the existing study facilities are contained in Appendix B of the Traffic Impact Analysis (Initial Study Appendix 6). The existing turning movement volumes, intersection geometrics, and traffic controls are illustrated in Figure 2 of Initial Study Appendix 6.

Intersections

1. San Pablo Avenue / Clinton Avenue
2. Glenn Avenue / Clinton Avenue
3. Blackstone Avenue / Cambridge Avenue
4. Blackstone Avenue / Weldon Avenue
5. Blackstone Avenue / University Avenue
6. Blackstone Avenue / McKinley Avenue

Project Only Trips to State Facilities

1. State Route 41 at McKinley Avenue Interchange
2. State Route 180 at Blackstone Avenue/Abby Street Interchange

Study Scenarios

Existing Traffic Conditions

This scenario evaluates the Existing Traffic Conditions based on existing traffic volumes and roadway conditions from traffic counts and field surveys conducted in April and June 2019. June counts were prorated upward to closely match upstream and downstream traffic counts collected while all schools in the vicinity of the project were in session.

Existing plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Existing plus Project Traffic Conditions. The Existing plus Project traffic volumes were obtained by adding the Project Only Trips to the Existing Traffic Conditions scenario. The Net New Project Only Trips to the study facilities were developed based on existing travel patterns, the Fresno COG Project Select Zones, the existing roadway network, engineering judgment, data provided by the District, knowledge of the study area, existing residential and commercial densities, and the City of Fresno 2035 General Plan Circulation Element in the vicinity of the project. The Fresno COG Models for the Project Select Zones are contained in Appendix C of the Traffic Impact Analysis (Initial Study Appendix 6).

Existing plus Project Traffic Conditions – No Parking Structure Access to Cambridge Avenue

This scenario evaluates total traffic volumes and roadway conditions based on the Existing plus Project Traffic Conditions – No Parking Structure Access to Cambridge Avenue. The Existing plus Project – No Parking Structure Access to Cambridge Avenue traffic volumes were obtained by adjusting the anticipated trip distribution of the

Parking Structure component of the proposed Project. This scenario assumes that the Parking Structure will not have direct access to Cambridge Avenue.

Near Term plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Near Term plus Project Traffic Conditions. The Near Term plus Project traffic volumes were obtained by adding the Near Term related trips to the Existing plus Project Traffic Conditions scenario.

Cumulative Year 2035 No Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2035 No Project Traffic Conditions. The Cumulative Year 2035 No Project traffic volumes were obtained by subtracting Project Only Trips from the Cumulative Year 2035 plus Project traffic volumes.

Cumulative Year 2035 plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2035 plus Project Traffic Conditions. The Cumulative Year 2035 plus Project traffic volumes were obtained from the Fresno COG traffic model runs (Base Year 2019 and Cumulative Year 2035) and existing traffic counts. Under this scenario, the increment method, as recommended by the Model Steering Committee was utilized to determine the Cumulative Year 2035 plus Project traffic volumes. The Fresno COG models are contained in Appendix C of the Traffic Impact Analysis (Initial Study Appendix 6).

Conclusions and Recommendations

The potential impacts of the proposed project were evaluated in accordance with the standards set forth by the level of service (LOS) policies of the City of Fresno. Impacts of each scenario are described below, as well as recommendations for reducing those impacts.

Existing Traffic Conditions

- At present, the intersection of Blackstone Avenue and University Avenue exceeds its LOS threshold during both peak periods. To improve the LOS at this intersection, it is recommended that the following improvements be made at University Avenue and Blackstone Avenue:
    - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

Existing plus Project Traffic Conditions

- At present, the project is estimated to generate a maximum of 2,045 daily trips, 262 AM peak hour trips and 237 PM peak hour trips. However, the trip generation of the project will differ as a result of the relocation, expansion and modification of the project's land uses. At buildout, the proposed Future Project is estimated to generate a maximum of 2,230 daily trips, 287 AM peak hour trips and 268 PM peak hour trips. Compared to the Existing Project Trip Generation, the Future Project Trip Generation is estimated to be slightly higher by 185 daily trips, 25 AM peak hour trips, and 31 PM peak hour trips.
- As the project will be used to serve an existing student and employee population, it is likely that the project would not add VMT per capita. Additionally, the project site is located near transit services and pedestrian and bicycle networks.

- The project's proposed parking structure is anticipated to add up to 1,000 parking spaces, while replacing 189 parking stalls. Therefore, the net change is 811 parking stalls (1,000 new parking stalls minus 189 existing parking stalls results in 811 net new parking stalls). Given that the current number of general public and metered on-site parking stalls is 2,388 and the Project will add 811 general public parking stalls, the new total of general public and metered on-site parking stalls will be 3,199 parking stalls. Since the parking supply is projected to be up to 3,199 general public and metered onsite parking stalls, it is anticipated that the FCC campus will have sufficient parking supply to accommodate the projected parking demand in the year 2028.
- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is it is recommended that, in addition to the improvements recommended for the *Existing Traffic Conditions* scenario, the following improvements be made:
  - At University Avenue and Blackstone Avenue, modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.
  - While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented: add a southbound U-turn-turn lane; remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and modify the traffic signal to accommodate the added lane.
- It is recommended that the project implement a Class I Bike Routes along its frontage to Glenn Avenue, Cambridge Avenue and Weldon Avenue.
- It is recommended that the project retain the existing walkways that are in a good state and ADA compliant along its frontages to San Pablo Avenue, Blackstone Avenue, Cambridge Avenue, and Weldon Avenue. The project shall reconstruct walkways where needed to conform to current ADA guidelines.
- It is recommended that additional covered bus shelters be added along McKinley Avenue to help promote transit use during inclement weather conditions such as rain and extreme heat. Where possible, consideration should be given to the planting of trees to provide shade and help reduce heat during the summer months. Additionally, it is recommended that the District work with FAX to improve headways of the existing transit routes serving the FCC campus.

Existing plus Project Traffic Conditions – No Parking Structure Access to Cambridge Avenue

- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the improvements recommended for the *Existing plus Project Traffic Conditions* scenario be implemented.
- When compared to the *Existing plus Project Traffic Conditions* scenario, the prevention of the Parking Structure's access to Cambridge Avenue will encourage most southbound traffic on Blackstone Avenue and all northbound traffic on Blackstone Avenue to enter the site via Weldon Avenue, thus reducing traffic on

Cambridge Avenue between Glenn Avenue and Blackstone Avenue. As can be seen from Tables V and VI, the prevention of the Parking Structure's access to Cambridge Avenue is projected to slightly improve the LOS at the intersection of Blackstone Avenue and Cambridge Avenue while the LOS at the intersection of Blackstone Avenue and Weldon Avenue is projected to slightly worsen.

Near Term plus Project Traffic Conditions

- The total trip generation for the Near Term Project is 2,132 daily trips, 171 AM peak hour trips and 150 PM peak hour trips.
- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the improvements identified in the *Existing plus Project Traffic Conditions* scenario be implemented.

Cumulative Year 2035 No Project Traffic Conditions

- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is it is recommended that the improvements identified in the *Existing plus Project Traffic Conditions* scenario be implemented.

Cumulative Year 2035 plus Project Traffic Conditions

- Under this scenario, the intersections of Glenn Avenue and Clinton Avenue, Blackstone Avenue and Cambridge Avenue, and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is it is recommended that the following improvements be implemented, in addition to the improvements identified in the *Existing plus Project Traffic Conditions* scenario.
    - At Glenn Avenue and Clinton Avenue: Modify the northbound left-right lane to a left-turn lane; add a northbound right-turn lane; and eliminate curbside parking along Glenn Avenue within the limits of the proposed right-turn lane and transitions thereof. The Queuing Analysis presents the storage capacity recommendation for this movement.

Queuing Analysis

The Traffic Impact Analysis included a Queuing Analysis (see Initial Study Appendix 6, pages 45-48), which compares the storage capacity of traffic lanes to existing and future traffic scenarios. Based on the Queuing Analysis, the report included recommendations to consider increasing turn lane storage lengths at the Study Intersections. However, the report also makes reference to several existing conditions that may affect implementation of the recommended movements (see Appendix 6 for more detailed information). A mitigation measure has been included requiring that SCCCD seek to work with the City of Fresno regarding implementation of the queuing length recommendations.

Project Pro-Rata Fair Share of Future Transportation Improvements

The project's fair share percentage impacts to study intersections projected to fall below their LOS threshold and which are not covered by an existing impact fee program is provided in Table 6.17-B. (Details regarding calculation of the project's fair share percentage impacts are presented in the Traffic Impact Analysis, Initial Study Appendix 6).

Table 6.17-B
Project Fair Share of Future Roadway Improvements

Intersection	Existing Traffic Volumes (PM Peak)	Cumulative Year 2035 plus Project Traffic Volumes (PM Peak)	Project Only Trips (PM Peak)	Project Fair Share (%)
Glenn Avenue / Clinton Avenue	1,623	2,008	56	14.55
Blackstone Avenue / Cambridge Avenue	2,304	2,982	180	26.55
Blackstone Avenue / Weldon Avenue	2,533	3,318	434	55.29
Blackstone Avenue / University Avenue	2,304	2,880	297	51.56

Note: Project Fair Share= ((Net New Project Only Trips)/(Cumulative Year 2035 + Project Traffic Volumes – Existing Traffic Volumes)) x 100

It is recommended that the project contribute its equitable fair share as listed in Table 6.17-B for the future improvements necessary to maintain an acceptable LOS. However, fair share contributions should only be made for those facilities, or portion thereof, currently not funded by the responsible agencies roadway impact fee program(s) or grant funded projects, as appropriate. For those improvements not presently covered by local and regional roadway impact fee programs or grant funding, it is recommended that the project contribute its equitable fair share. Payment of the project's equitable fair share in addition to the local and regional impact fee programs would satisfy the project's traffic mitigation measures. The Traffic Impact Analysis does not provide construction costs for the recommended mitigation measures; therefore, if the recommended mitigation measures are implemented, it is recommended that the District work with the City of Fresno to develop the estimated construction cost.

Bicycle, Pedestrian, and Transit Evaluation

The Traffic Impact Analysis presented recommendations to ensure the functionality and safety of the circulation system for bicycle and pedestrian access to and from the project, which include:

- Implementing Class I Bike Lanes along the frontages to Glenn Avenue, Cambridge Avenue, and Weldon Avenue.
- Retaining the existing walkways that are in a good state and ADA compliant along its frontages to San Pablo Avenue, Blackstone Avenue, Cambridge Avenue, and Weldon Avenue, plus reconstructing walkways where needed to conform to current Americans With Disabilities Act (ADA) guidelines.

Additionally, the analysis recommended that SCCCD work with FAX to improve headways of the existing transit routes serving the FCC campus. These recommendations have been included as mitigation measures to ensure that the project is supportive of a network of bike lanes, walkways, and transit connections in the project vicinity while also being functional and safe for users.

As discussed in Section 6.17(b), the project is located in a built-out urban area with existing walkways and bicycle lanes adjacent to the project site and is served by three FAX-operated transit lines (including a BRT line). Development and operation of the project is consistent with the overarching aims of increasing utilization of walking and bicycling facilities, increasing the access provided by this network, and providing a network that is safe and equitable. For these reasons, and with implementation of the recommended mitigation measures, the project would be consistent with applicable transportation programs, plans, ordinances and policies pertaining to bicycle and pedestrian transportation as well as transit.

The following measures shall be implemented to reduce potential impacts of the project regarding the transportation circulation system:

Mitigation Measure T-1: To achieve an acceptable LOS in the project vicinity, SCCCD shall participate in the following improvements:

a. At the intersection of Blackstone Avenue and Cambridge Avenue, prior to operation of the project: Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue. Additionally, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented.

b. At the intersection of Blackstone Avenue and University Avenue, prior to operation of the project: Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

c. At the intersection of Blackstone Avenue and Weldon Avenue, prior to operation of the project: Add a southbound U-turn-turn lane; remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and modify the traffic signal to accommodate the added lane.

d. At the intersection of Glenn Avenue and Clinton Avenue, prior to the occurrence of Cumulative Year 2035 Traffic Conditions: Modify the northbound left-right lane to a left-turn lane; add a northbound right-turn lane; and eliminate curbside parking along Glenn Avenue within the limits of the proposed right-turn lane and transitions thereof. Refer to the Queuing Analysis for the storage capacity recommended for this movement.

Mitigation Measure T-2: SCCCD shall be responsible for contributing its proportionate share of the installation of improvements at the intersections identified in Table 6.17-B, Project Fair Share of Future Roadway Improvements. Fair share contributions shall only be made for those facilities, or portion thereof, currently not funded by the responsible agencies roadway impact fee program(s) or grant funded projects, as appropriate. It is recommended that SCCCD work with the City of Fresno to develop the estimated construction cost.

Mitigation Measure T-3: SCCCD shall work with the City of Fresno to review and implement the recommended left-turn and right-turn lane storage lengths as indicated in the Queuing Analysis.

Mitigation Measure T-4: The project shall implement Class I Bike Routes along the following areas: Glenn Avenue within the project site, along the project's frontage to Cambridge Avenue (between San Pablo Avenue and Blackstone Avenue), and Weldon Avenue within the project site.

Mitigation Measure T-5: The project shall retain existing walkways that are in a good state and compliant with requirements of the Americans With Disabilities Act (ADA) along its frontages to San Pablo Avenue, Blackstone

Avenue, Cambridge Avenue, and Weldon Avenue. SCCCD shall act to ensure that any gaps be filled and that the project reconstruct walkways where needed to conform to current California Building Code and ADA requirements as well as to promote pedestrian access at the project.

Mitigation Measure T-6: To help facilitate transit usage at the project, SCCCD shall coordinate with FAX to improve headways of the existing transit routes serving the FCC campus, and landscape design for the project shall take into consideration measures such as tree plantings which may provide shade and help reduce heat at transit stops during the summer months.

Level of Significance After Mitigation: With implementation of the project related to performance of the transportation circulation system would be less than significant.

b. Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

CEQA Guidelines section 15064.3 describes specific considerations for evaluating a project's transportation impacts and provides that, generally, vehicle miles traveled is the most appropriate measure of transportation impacts. 15064.3(b)(1) addresses land use projects as follows:

> *Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high-quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.*

The project is located on and adjacent to the existing Fresno City College campus, which itself is located in a built-out urban area, so it will not require the construction of new roadways. Additionally, the project site is located near transit service (including the FAX Route 1 Q BRT line) plus pedestrian and bicycle networks. As the project will be used to serve an existing student and employee population, it is likely that the project would not add VMT per capita. Based on these factors, the project does not conflict with 15064.3(b) and is presumed to have a less than significant impact.

c. Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

SCCCD will comply with all City of Fresno policies and standards pertaining to transportation access at the site. For example, the District will consult with the City to determine the final placement of driveways and their access type. Additionally, implementation of the mitigation measures identified in Section 6.17(a) would contribute to a further reduction in the potential for hazards. For these reasons, and with implementation of the recommended mitigation measures, the project would result in a less than significant impact related to hazards resulting from roadway design features or incompatible uses.

A notable design feature of the existing Fresno City College campus is that it is partially divided by railroad tracks, which run diagonally from northwest to southeast near the campus core. An underpass at Weldon Avenue allows vehicle and pedestrian traffic to travel beneath the railroad tracks to traverse the campus. There is an existing continuous barrier in place along the entire length of either side of tracks on the campus; the barrier mostly consists of fencing (wrought-iron on the east side, chain-link on the west side, underpass-specific fencing) but also includes a section of masonry wall and a portion of the Health Sciences building.

As part of the project's review, project information was distributed to BNSF Railway, who maintains and operates the tracks. A response letter from BNSF indicated that, in order to deter pedestrian crossings over the tracks between the project site and the existing campus core, fencing should be extended between the crossings to the north and south of the underpass. It is noted that there is fencing already present where the project site meets the railroad right-of-way (i.e., on the east side of the railroad tracks), and the project will include installation of additional wrought-iron fencing at the proposed Maintenance & Operations parking area which will be contiguous with existing wrought-iron fencing at the east side of the campus. The proposed Maintenance & Operations Building and parking area would generally not be trafficked by students because these facilities provide for campus maintenance-related activities and do not include classrooms or other student-oriented space. The more intensive, student-oriented uses included in the project (e.g. the Science Building and parking structure) are located further east nearer to Blackstone Avenue, and it is expected that these uses will be accessed via Blackstone or via the existing FCC campus circulation network. Further, despite any additional fencing, openings would have to remain at Clinton Avenue and McKinley Avenue in order for the railroad to be operational. Therefore, impacts related to the proximity of railroad facilities are considered less than significant.

Mitigation Measure: Implement Mitigation Measures T-1 through T-6

Level of Significance after Mitigation: With implementation of the recommended mitigation measures, impacts of the project regarding transportation-related hazards would be less than significant.

d. Would the project result in inadequate emergency access?

SCCCD will work with the City of Fresno and responsible emergency services agencies to ensure adequate emergency access exists for the proposed project, and the District will follow objectives and policies of the City of Fresno General Plan that will support implementation and provide adequate emergency access. As mentioned in Section 6.17(c), the roadways associated with the project will be designed according to applicable governmental agency design standards. Emergency access may be hindered during periods of construction and the removal action, but alternative routes would be available. Therefore, this impact would be less than significant.

6.18 Tribal Cultural Resources

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in the Public Resource Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
(i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in the Public Resources Code § 5020.1(k)?			✓	
(ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant		✓		

pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe?				

a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

(i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or

(ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

In accordance with AB 52[6], potentially affected tribes were formally notified of this project and were given the opportunity to request consultation on the project. In response to the notification, two tribes (Table Mountain Rancheria and Big Sandy Rancheria, Band of Western Mono Indians) submitted letters indicating no comment or concerns regarding the project. No requests for consultation were received nor were any other comments provided by the notified tribes. As discussed in Section 6.5 (Cultural Resources), the project site is located in a highly disturbed, heavily urbanized area within the City of Fresno, thus it is generally not known or expected to be a sensitive resource area. At this time, the District has no information or evidence that Tribal Cultural Resources exist in relation to the site or will be affected by the project. However, it is possible that subsurface resources could exist and be disturbed by project construction activities. Therefore, the following mitigation measure has be incorporated into the project:

Mitigation Measure TC-1: Mitigation for Potential Discovery of Subsurface Resources

If tribal cultural resources are discovered during construction activities, construction shall stop in the immediate vicinity of the find and a qualified professional with expertise in tribal cultural resources shall be consulted to recommend an appropriate course of action with the input of potentially affected tribes. If it is determined by the Lead Agency that the project may cause a substantial adverse change to a tribal cultural resource, mitigation measures to be considered should include those identified in Public Resources Code Section 21084.3.

Level of Significance after Mitigation: With implementation of the recommended mitigation measure, impacts of the project regarding tribal cultural resources would be less than significant.

[6] Assembly Bill (AB) 52 requires as part of CEQA review a consultation process with all California Native American Tribes on the Native American Heritage Commission List. The list includes both federally and non-federally recognized tribes. The bill requires notification be provided to tribes that are traditionally and culturally affiliated with the geographic area of a proposed project if they have requested notice of projects proposed within that area. If a tribe requests consultation within 30 days upon receipt of the notice, the lead agency must consult with the tribe. Consultation may include discussing the type of environmental review necessary, the significance of tribal cultural resources, the significance of the project's impacts on the tribal cultural resources, and alternatives and mitigation measures recommended by the tribe. The parties must consult in good faith, and consultation is deemed concluded when either of the parties agree to measures to mitigate or avoid a significant effect on a tribal cultural resource (if such a significant effect exists) or when a party concludes that mutual agreement cannot be reached.

6.19 Utilities and Service Systems

Would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects?		✓		
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?			✓	
c. Result in determination by the wastewater treatment provider, which serves or may serve the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			✓	
d. Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			✓	
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			✓	

Would the project:

a. **Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects?**

The impact of the proposed project on the above items, except for stormwater drainage, would be less than significant. The reasons for this conclusion are as follows:

Water and Wastewater

The project site is within the City of Fresno and would receive water supply and wastewater collection and treatment services from the City's Department of Public Utilities for the project. Existing water and wastewater system infrastructure which serve the Fresno City College campus and surrounding development are in place at the project. Details of the project were distributed to the Department of Public Utilities (DPU) for review and comment; however, no response was provided from either DPU or through another department regarding water and wastewater. The project would be developed in a manner compliant with the Department of Public Utilities standards, specifications, and policies.

Electric Power, Natural Gas, and Telecommunications

The project site is located in an urbanized area with existing electrical and natural gas service utilities in place as well as telecommunications facilities such as cellular towers and broadband internet connections. Development of the project will be subject to compliance with applicable rules, regulations, and policies regarding connections to these utilities. As such, any impacts that would occur related to relocation or construction of electrical, natural gas, or telecommunications facilities would be less than significant.

Storm Drainage

The Fresno Metropolitan Flood Control District (FMFCD) provides storm water drainage services to the proposed project area. As previously discussed in Section 6.11(c), the project site is located in FMFCD's Basin "RR" area, which is an area that has been urbanized for many years and has existing drainage infrastructure in place. The volume of stormwater runoff from the proposed educational and administrative facilities may not substantially differ from the existing conditions at the project site. However, to the extent that any proposed densification of the project area exceeds the capacity of the existing storm drainage system, mitigation will be required in the form of on-site retention or FMFCD system modifications, which must be reviewed and approved by FMFCD prior to implementation. Mitigation Measure HW-1 would be applicable to this potential impact and would reduce it to less than significant level.

Mitigation Measure: Implement Mitigation Measure HW-1

Level of Significance after Mitigation: With implementation of the recommended mitigation measure, potential impacts related to stormwater drainage facilities would be less than significant.

b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

The City of Fresno's 2015 Urban Water Management Plan includes a Water Supply Reliability Assessment, which evaluates the City's anticipated water supplies and water demands in normal year, single dry year, and multiple dry year scenarios. According to the UWMP, the City's water supplies are projected to meet its water demands under all three scenarios through 2040 (see 2015 UWMP Chapter 7).

As discussed in Section 6.10 (Hydrology and Water Quality), the project's demand for water is not expected to substantially differ from the demand projected from the uses planned on the site in the City's General Plan, on which assumptions and projections of the UWMP are based. Project information was distributed to the City of Fresno's Department of Public Utilities for review and comment, and no comments were received indicating any concerns regarding the adequacy and available of its water supplies to serve the project. Based on this information, this impact is less than significant.

c. Result in determination by the wastewater treatment provider, which serves or may serve the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The City of Fresno owns and operates the Fresno-Clovis Regional Wastewater Reclamation Facility (RWRF), which provides a majority of the wastewater treatment for the City. Per the Fresno General Plan Master EIR, the facility received and treated approximately 64.5 million gallons per day (mgd) during 2011 with the permitted capacity to treat up to 88.0 mgd as a maximum monthly average flow; the quantity of wastewater received and treated has been declining since 2006, when it peaked at an annual average daily flow of approximately 72.1 mgd. The generation of wastewater that would occur from the proposed campus facilities expansion project would be similar to (if not less than) what was projected in the General Plan MEIR, as the project's users are already present in the service area for the RWRF. Further, project information was distributed to the City of Fresno's Department of Public Utilities for review and comment, and no comments were received indicating any concerns regarding the adequacy to provide wastewater treatment for the project. This impact is thus less than significant.

d. Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Within the City of Fresno, non-recyclable solid waste is generally taken to the American Avenue Landfill, located approximately six miles southwest of the City of Kerman. The American Avenue Landfill is owned and operated by Fresno County and began operations in 1992 for both public and commercial solid waste haulers. As described in the City of Fresno General Plan Master EIR, the American Avenue Landfill has a maximum permitted capacity of 32,700,000 cubic yards and a remaining capacity of 29,358,535 cubic yards, with an estimated closure date of August 31, 2031. The maximum permitted throughput is 2,200 tons per day (CalRecycle, 2014). Other landfills within the County of Fresno include the Clovis Landfill with a maximum remaining permitted capacity of 7,740,000 cubic yards, a maximum permitted throughput of 2,000 tons per day, and an estimated closure date of 2047 (CalRecycle, 2014). There is also the Coalinga Landfill with a maximum remaining capacity of 1,930,062 cubic yards, a maximum permitted throughput of 200 tons per day, and an estimated closure date of 2029 (CalRecycle, 2014).

As discussed elsewhere in this report, the project would primarily serve existing users at the FCC campus and is consistent with the level of land use intensity planned for the site and its vicinity, so impacts related to solid waste generation are not anticipated to significantly differ from existing conditions and assumptions affecting solid waste planning and goals. Additionally, based on the above information, there is sufficient available landfill capacity to accommodate the project. The impact of the proposed campus facilities expansion project in relation to solid waste impacts would thus be less than significant.

Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

The District operates its existing facilities in compliance with applicable statutes and regulation related to solid waste and would continue to do so upon operation of the proposed project. Therefore, no impact would occur.

6.20 Wildfire

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?				✓
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from wildfire or the uncontrolled spread of wildfire?				✓
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel				✓

breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in the temporary or ongoing impacts to the environment?				
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				✓

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

a. Substantially impair an adopted emergency response plan or emergency evacuation plan?

No impacts related to wildfire would result from the project. The project site is located within a highly urbanized area of the City of Fresno and is not within a State Responsibility Area (SRA) or any area classified as high-risk for wildfire.

b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

This impact is addressed in Section 6.20(a).

c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

This impact is addressed in Section 6.20(a).

d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

This impact is addressed in Section 6.20(a).

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6.21 Mandatory Findings of Significance

	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?		✓		
b. Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)			✓	
c. Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?		✓		

a. Does the proposed project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

Based on the information in Sections 6.5 and 6.18, the project could have potentially significant effects on cultural resources and tribal cultural resources, but these effects would be less than significant with the incorporation of the mitigation measures provided. As discussed in Section 6.4, potential impacts to biological resources would be less than significant with mitigation.

b. Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)

Based on the information throughout Section 6 of the Initial Study, the proposed project would not have any impacts that would be individually limited but cumulatively considerable.

c. Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?

Based on the information in Sections 6.3 and 6.13, the proposed project could potentially have substantial adverse effects on human beings with respect to air quality and noise. However, mitigation measures have been incorporated in the project that would reduce the impacts to levels that are less than significant.

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7. Mitigation Monitoring and Reporting

7.1 Purpose

State Center Community College District has prepared this Mitigation Monitoring and Reporting Program to comply with Section 15097 of the State CEQA Guidelines. The purpose for the Mitigation Monitoring and Reporting Program is to ensure implementation of the mitigation measures identified in this Initial Study.

7.2 Lead Agency

State Center Community College District will undertake the project and is the Lead Agency for the project. The District is responsible for the implementation of all mitigation measures identified in this Initial Study.

7.3 Mitigation Monitoring and Reporting Coordinator

The Vice Chancellor of Operations and Information Systems, or his/her designee shall act as the Project Mitigation Monitoring and Reporting Coordinator ("Coordinator").

7.4 Monitoring and Reporting Procedures for Design-, Site Clearing-, and Construction Mitigation Measures

1. The Coordinator shall provide a copy of all project design-, site clearing- and construction-related mitigation measures to the project engineer and contractor for incorporation in the project plans, construction specifications, permits, and contracts, as appropriate.
2. Prior to award of bid, the Coordinator shall determine that all project design-, site clearing- and construction-related mitigation measures have been incorporated in the project plans, construction specifications, permits, and contracts, as appropriate.
3. During construction, the Coordinator, through the construction management team, shall inspect the project area regularly to ensure all work complies with the mitigation measures. If a discrepancy is not resolved within a reasonable time, the Coordinator may order work to cease until the discrepancy is resolved.
4. Prior to the District accepting the project improvements, the Coordinator shall certify that the project incorporates all project design and construction-related mitigation measures.

7.5 Monitoring and Reporting Procedures for Operational- and Maintenance-Related Mitigation Measures

Before the project becomes operational, the Coordinator shall determine that the project operational plans and procedures incorporate all operations-related mitigation measures.

8. Names of Persons Who Prepared or Participated in the Initial Study/Environmental Checklist

8.1 Lead Agency

State Center Community College District
1171 Fulton Street
Fresno, CA 93721
Telephone: (559) 243-7191

Contacts:

Christine Miktarian, Vice Chancellor of Operations and Information Systems
Email: Christine.Miktarian@scccd.edu

George Cummings, Director of Facilities Planning
Email: George.Cummings@scccd.edu

8.2 Environmental Review Consultant

Odell Planning & Research, Inc.
49346 Road 426, Suite 2
Oakhurst, California 93644
Telephone: (559) 472-7167

Contacts:

Scott B. Odell, AICP, Principal & Project Manager
E-mail: scott@odellplanning.com

Daniel Brannick, Associate Planner
E-mail: daniel@odellplanning.com

8.3 Technical Consultants

Ambient Air Quality & Noise Consulting (Air Quality, Energy, Greenhouse Gas Emissions, and Noise Impacts)
612 12th Street, Suite 201
Paso Robles, CA 93446
(805) 226-2727
www.ambient.consulting

JLB Traffic Engineering, Inc. (Transportation Impacts)
1300 E. Shaw Ave., Ste. 103
Fresno, CA 93710
(559) 570-8991
www.JLBtraffic.com

Sierra Valley Cultural Planning (Cultural Resources Impacts)
40854 Oak Ridge Drive
Three Rivers, CA 93271
(559) 288-6375
Karana Hattersley-Drayton, M.A., Architectural Historian

9. Sources Consulted

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APPENDIX 1

Site Photographs of Expansion Areas and Vicinity

Site Photographs of Expansion Areas and Vicinity
Fresno City College Parking and Facilities Expansion Project

INTRODUCTION

During preparation of the Initial Study for the Fresno City College Parking and Facilities Expansion Project, multiple visits were made to the project site and its surrounding vicinity in order to effectively ascertain the aesthetic setting and potential effects of the project on the surrounding area. Presented here for reference are pictures of the project site and its vicinity which were taken on August 24, 2019 between the hours of 10:30 AM and 11:30 AM. The pictures focus on presenting the locations where the FCC campus would be expanded through development of the proposed project and the present conditions of these locations.

Each picture includes a description of the approximate location where it was taken, followed by an indication of its directional point-of-view (e.g. north, east, south, west). Street names mentioned in the descriptions include only the primary name of the street and omit words like "Avenue" which reference a type of street (e.g. Blackstone Avenue is simply referred to as "Blackstone").

Key for abbreviations of compass directions as used in descriptions:

- "N" means North
- "NE" means Northeast
- "NW" means Northwest
- "NNE" means North-Northeast
- "NNW" means North-Northwest
- "E" means East
- "ENE" means East-Northeast
- "ESE" means East-Southeast
- "S" means South
- "SE" means Southeast
- "SW" means Southwest
- "SSE" means South-Southeast
- "SSW" means South-Southwest
- "W" means West
- "WNW" means West-Northwest
- "WSW" means West-Southwest

West end of Yale, looking NW

West end of Yale, looking North

West end of Yale, looking NE

West end of Yale, looking E

West end of Yale, looking SE

San Pablo at Yale, looking W

San Pablo at Yale, looking SW

San Pablo at Yale, looking S

San Pablo near Cambridge, looking N

San Pablo near Cambridge, looking NW

San Pablo near Cambridge, looking W

Cambridge at FCC Lot "O", looking E

Cambridge at FCC Lot "O", looking S

Cambridge at FCC Lot "O", looking SSE

Glenn at Cambridge, looking SE

Glenn at Cambridge, looking S

Glenn at Cambridge, looking SW

Driveway of FCC Lot “O”, looking NW

Driveway of FCC Lot “O”, looking N

Driveway of FCC Lot “O”, looking NE

Cambridge near west end of vacant lot, looking E

Cambridge near west end of vacant lot, looking SE

West end of vacant lot (close-up), looking SE

Cambridge at middle of vacant lot, looking SW

Cambridge at middle of vacant lot, looking S

Cambridge at middle of vacant lot, looking SE

Cambridge at east end of vacant lot, looking SW

Cambridge at duplex, looking S

Cambridge at east side of duplex, looking SW

Cambridge at east side of duplex, looking WSW

Cambridge at east side of duplex, looking W

SW Corner of Blackstone and Cambridge, looking SW

NE Corner of Blackstone Ave. and Cambridge Ave., looking W

NE Corner of Blackstone Ave. and Cambridge Ave., looking SW

NE Corner of Blackstone Ave. and Cambridge Ave., looking SSW

Site Photographs of Expansion Areas and Vicinity:
Fresno City College Parking and Facilities Expansion Project

SW Corner of Blackstone Ave. and University Ave., looking N

SW Corner of Blackstone Ave. and University Ave., looking NW

SW Corner of Blackstone Ave. and University Ave., looking W

APPENDIX 2

Air Quality & Greenhouse Gas Impact Analysis

AIR QUALITY & GREENHOUSE GAS IMPACT ANALYSIS

FOR

FRESNO CITY COLLEGE PARKING & FACILITIES EXPANSION PROJECT

STATE CENTER COMMUNITY COLLEGE DISTRICT
FRESNO, CA

JULY 2019

PREPARED FOR:
ODELL PLANNING & RESEARCH, INC.
49346 ROAD 426, SUITE 2
OAKHURST, CA 93644

PREPARED BY:

AMBIENT
AIR QUALITY & NOISE CONSULTING
612 12TH STREET, SUITE 201
PASO ROBLES, CA 93446

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LIST OF COMMON TERMS & ACRONYMS

AAM	Annual Arithmetic Mean
AHERA	Asbestos Hazard Emergency Response Act
ASHAA	Asbestos School Hazard Abatement Act
ASHARA	Asbestos School Hazard Abatement and Reauthorization Act
ATCM	Airborne Toxic Control Measure
CAAQS	California Ambient Air Quality Standards
ARB	California Air Resources Board
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DPM	Diesel-Exhaust Particulate Matter or Diesel-Exhaust PM
DRRP	Diesel Risk Reduction Plan
FCAA	Federal Clean Air Act
GHG	Greenhouse Gases
HAP	Hazardous Air Pollutant
IPCC	Intergovernmental Panel on Climate Change
LOS	Level of Service
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NESHAPs	National Emission Standards for HAPs
NO_x	Oxides of Nitrogen
O_3	Ozone
Pb	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter (less than 10 µm)
$PM_{2.5}$	Particulate Matter (less than 2.5 µm)
ppb	Parts per Billion
ppm	Parts per Million
ROG	Reactive Organic Gases
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur Dioxide
SRTS	Safe Routes to School
TAC	Toxic Air Contaminant
TSCA	Toxic Substances Control Act
$\mu g/m^3$	Micrograms per cubic meter
U.S. EPA	United State Environmental Protection Agency

INTRODUCTION

This report describes the existing environment in the project vicinity and identifies potential air quality and greenhouse gas impacts associated with the proposed project. Project impacts are evaluated relative to applicable thresholds of significance. Mitigation measures have been identified for significant impacts.

PROPOSED PROJECT

The proposed project includes expansion of various onsite parking and facilities at Fresno City College. The project location is depicted in Figures 1 and 2. The following facilities and activities are planned as part of the project. Development of the facilities would occur over the next five years.

- Construction of a parking structure on the south side of Cambridge Avenue west of Blackstone Avenue located north of the existing district office building. The proposed parking structure would have capacity for up to 1,000 parking spaces, include up to five levels of parking, and include ingress/egress points at Weldon Avenue and potentially Cambridge Avenue.
- Construction of a three-story Science Building (approximately 95,000 square feet) located near the southwest corner of Blackstone and Weldon Avenues. The new Science Building is proposed to include 6 biology labs, 3 anatomy and physiology labs, 5 chemistry labs, 2 physics labs, 2 engineering labs, a computer lab, 3 general educational classrooms, 4 Design Science (Middle College) classrooms, welcome center, tutorial space, and 34 faculty offices. Surface parking would also be added adjacent to the building. Existing Maintenance & Operations facilities located in this area would be removed and relocated to a different area of the campus (see below).
- Replacement of the existing one-story, 5,255 square-foot Child Development Center with a new one-story, 16,480 square-foot Child Development Center at its current location.
- Construction of a one-story, 10,000 square-foot Maintenance & Operations building plus a parking and storage area on the west side of San Pablo Avenue northwest of the existing Health Sciences Building.
- Repurposing of the existing District administration building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department.

AIR QUALITY

EXISTING SETTING

The project is located within the San Joaquin Valley Air Basin (SJVAB). The SJVAB is within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Air quality in the SJVAB is influenced by a variety of factors, including topography, local and regional meteorology. Factors affecting regional and local air quality are discussed below.

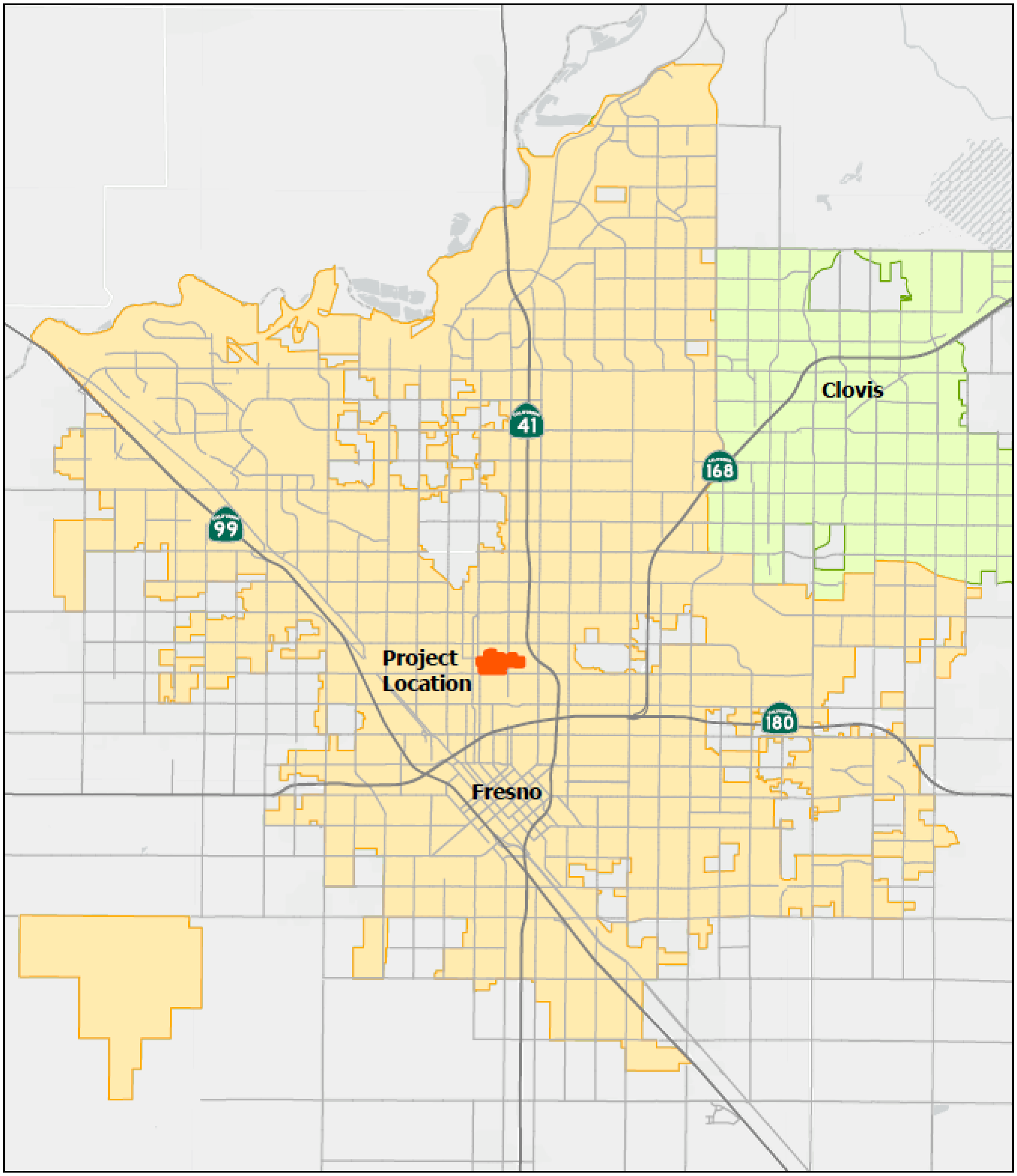
TOPOGRAPHY, METEOROLOGY, AND POLLUTANT DISPERSION

The dispersion of air pollution in an area is determined by such natural factors as topography, meteorology, and climate, coupled with atmospheric stability conditions and the presence of inversions. The factors affecting the dispersion of air pollution with respect to the SJVAB are discussed below.

Topography

The SJVAB occupies the southern half of the Central Valley. The SJVAB is open to the north, and is surrounded by mountain ranges on all other sides. The Coast Ranges, which have an average elevation of 3,000 feet, are along on the western boundary of the SJVAB, while the Sierra Nevada Mountains (8,000 to 14,000 feet in elevation) are along the eastern border. The San Emigdio Mountains, which are part of the

Figure 1
Project Location



Regional Location **Figure 1**

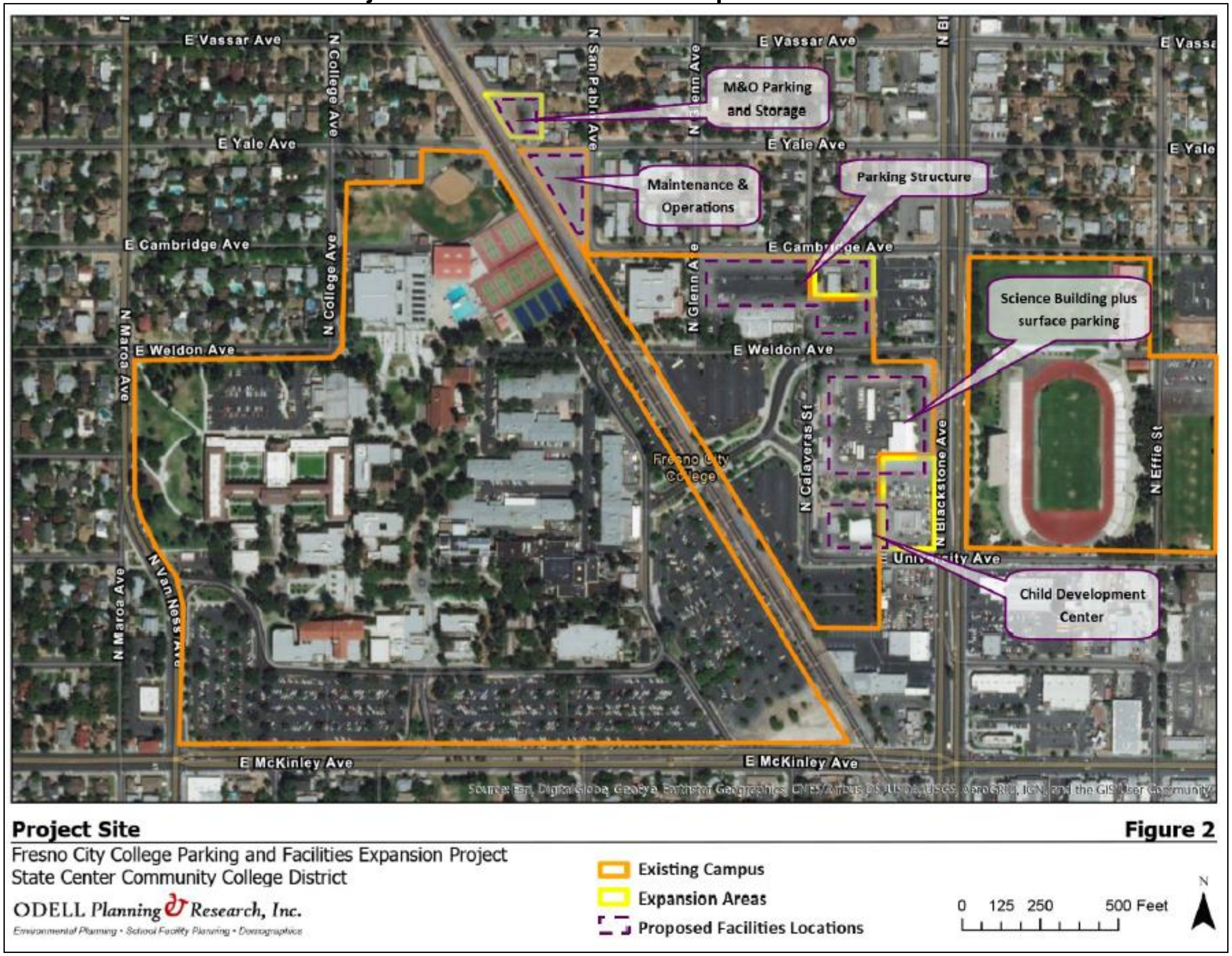
Fresno City College Parking and Facilities Expansion Project
State Center Community College District

ODELL Planning & Research, Inc.
Environmental Planning • School Facility Planning • Demographics

0 1 2 4 Miles
N

Source: OPR 2019

Figure 2
Project Site Boundaries and Proposed Facilities



Source: OPR 2019

Coast Ranges, and the Tehachapi Mountains, which are part of the Sierra Nevada, form the southern boundary, and have an elevation of 6,000 to 8,000 feet. The SJVAB is mostly flat with a downward gradient in terrain to the northwest.

Meteorology and Climate

The SJVAB has an inland Mediterranean climate that is strongly influenced by the presence of mountain ranges. The mountain ranges to the west and south induce winter storms from the Pacific Ocean to release precipitation on the western slopes producing a partial rain shadow over the valley. In addition, the mountain ranges block the free circulation of air to the east, trapping stable air in the valley for extended periods during the cooler half of the year.

Winter in the SJVAB is characterized as mild and fairly humid, while the summer is typically hot, dry, and cloudless. The climate is a result of the topography and the strength and location of a semi permanent, subtropical high-pressure cell. During the summer months, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below to the surface as a result of the northwesterly flow produces a band of cold water off the California coast. In winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms.

The annual temperature, humidity, precipitation, and wind patterns reflect the topography of the SJVAB and the strength and location of the semi permanent, subtropical high-pressure cell. Summer temperatures that often exceed 100 degrees Fahrenheit (°F) and clear sky conditions are favorable to ozone formation. Most of the precipitation in the valley occurs as rainfall during winter storms. The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions, which can result in higher pollutant concentrations. The orientation of the wind flow pattern in the SJVAB is parallel to the valley and mountain ranges. Summer wind conditions promote the transport of ozone and precursors from the San Francisco Bay Area through the Carquinez Strait, a gap in the Coast Ranges, and low-mountain passes such as Altamont Pass and Pacheco Pass. During the summer, predominant wind direction is from the northwest. During the winter, the predominant wind direction is from the southeast. Calm conditions are also predominant during the winter (ARB 1992).

The climate is semi-arid, with an annual normal precipitation of approximately 11 inches. Temperatures in the project area range from an average minimum of approximately 38°F, in January, to an average maximum of 98°F, in July (WRCC 2018).

Atmospheric Stability and Inversions

Stability describes the resistance of the atmosphere to vertical motion. The stability of the atmosphere is dependent on the vertical distribution of temperature with height. Stability categories range from "Extremely Unstable" (Class A), through Neutral (Class D), to "Stable" (Class F). Unstable conditions often occur during daytime hours when solar heating warms the lower atmospheric layers sufficiently. Under Class A stability conditions, large fluctuations in horizontal wind direction occur coupled with large vertical mixing depths. Under Class B stability conditions, wind direction fluctuations and the vertical mixing depth are less pronounced because of a decrease in the amount of solar heating. Under Class C stability conditions, solar heating is weak along with horizontal and vertical fluctuations because of a combination of thermal and mechanical turbulence. Under Class D stability conditions, vertical motions are primarily generated by mechanical turbulence. Under Class E and Class F stability conditions, air pollution emitted into the atmosphere travels downwind with poor dispersion. The dispersive power of the atmosphere decreases with progression through the categories from A to F.

With respect to the SJVAB, Classes D through F are predominant during the late fall and winter because of cool temperatures and entrapment of cold air near the surface. March and August are transition months with equally occurring percentages of Class F and Class A. During the spring months of April and May and the summer months of June and July, Class A is predominant. The fall months of September, October, and November have comparable percentages of Class A and Class F.

An inversion is a layer of warmer air over a layer of cooler air. Inversions influence the mixing depth of the atmosphere, which is the vertical depth available for diluting air pollution near the ground, thus significantly affecting air quality conditions. The SJVAB experiences both surface-based and elevated inversions. The shallow surface-based inversions are present in the morning but are often broken by daytime heating of the air layers near the ground. The deep elevated inversions occur less frequently than the surface-based inversions but generally result in more severe stagnation. The surface-based inversions occur more frequently in the fall, and the stronger elevated inversions usually occur during December and January.

AIR POLLUTANTS OF CONCERN

Criteria Air Pollutants

For the protection of public health and welfare, the Federal Clean Air Act (FCAA) required that the United States Environmental Protection Agency (U.S. EPA) establish National Ambient Air Quality Standards (NAAQS) for various pollutants. These pollutants are referred to as "criteria" pollutants because the U.S. EPA publishes criteria documents to justify the choice of standards. These standards define the maximum amount of an air pollutant that can be present in ambient air. An ambient air quality standard is generally specified as a concentration averaged over a specific time period, such as one hour, eight hours, 24 hours, or one year. The different averaging times and concentrations are meant to protect against different exposure effects. Standards established for the protection of human health are referred to as primary standards; whereas, standards established for the prevention of environmental and property damage are called secondary standards. The FCAA allows states to adopt additional or more health-protective standards. The air quality regulatory framework and ambient air quality standards are discussed in greater detail later in this report.

The following provides a summary discussion of the primary and secondary criteria air pollutants of primary concern. In general, primary pollutants are directly emitted into the atmosphere, and secondary pollutants are formed by chemical reactions in the atmosphere.

Ozone (O_3) is a reactive gas consisting of three atoms of oxygen. In the troposphere, it is a product of the photochemical process involving the sun's energy. It is a secondary pollutant that is formed when NO_X and volatile organic compounds (VOC) react in the presence of sunlight. Ozone at the earth's surface causes numerous adverse health effects and is a criteria pollutant. It is a major component of smog. In the stratosphere, ozone exists naturally and shields Earth from harmful incoming ultraviolet radiation.

High concentrations of ground level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments. Ozone also damages natural ecosystems such as forests and foothill communities, agricultural crops, and some man-made materials, such as rubber, paint, and plastics.

Reactive Organic Gas (ROG) is a reactive chemical gas, composed of hydrocarbon compounds that may contribute to the formation of smog by their involvement in atmospheric chemical reactions. No separate health standards exist for ROG as a group. Because some compounds that make up ROG are also toxic, like the carcinogen benzene, they are often evaluated as part of a toxic risk assessment. Total Organic Gases (TOGs) includes all of the ROGs, in addition to low reactivity organic compounds like methane and acetone. ROGs and VOC are subsets of TOG.

Volatile Organic Compounds (VOC) are hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and may also be toxic. VOC emissions are a major precursor to the formation of ozone. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

Oxides of Nitrogen (NO_X) are a family of gaseous nitrogen compounds and is a precursor to the formation of ozone and particulate matter. The major component of NO_X, nitrogen dioxide (NO_2), is a reddish-brown gas that is toxic at high concentrations. NO_X results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

Particulate Matter (PM), also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. U.S. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. U.S. EPA groups particle pollution into three categories based on their size and where they are deposited:

- "Inhalable coarse particles ($PM_{2.5}$- PM_{10})," such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.
- "Fine particles ($PM_{2.5}$)," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.
- "Ultrafine particles (UFP)," are very small particles less than 0.1 micrometers in diameter largely resulting from the combustion of fossils fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM_{10}, $PM_{2.5}$, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust.

Numerous scientific studies have linked both long- and short-term particle pollution exposure to a variety of health problems. Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and also acute (short-term) bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short term exposures, although they may experience temporary minor irritation when particle levels are elevated.

Carbon Monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air (unlike ozone). The main source of CO is on-road motor vehicles. Other CO sources include other mobile sources, miscellaneous processes, and fuel combustion from stationary sources. Because of the local nature of CO problems, the California Air Resources Board (ARB) and U.S. EPA designate urban areas as CO nonattainment areas instead of the entire basin as with ozone and PM_{10}. Motor vehicles are by far the largest source of CO emissions. Emissions from motor vehicles have been declining since 1985, despite increases in vehicle miles traveled, with the introduction of new automotive emission controls and fleet turnover.

Sulfur Dioxide (SO_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. However, like airborne NO_X, suspended SO_X particles contribute to the poor visibility. These SO_X particles can also combine with other pollutants to form $PM_{2.5}$. The prevalence of low-sulfur fuel use has minimized problems from this pollutant.

Lead (Pb) is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. The health effects of lead poisoning include loss of appetite, weakness, apathy, and miscarriage. Lead can also cause lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically.

Hydrogen Sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations; especially in enclosed spaces (800 ppm can cause death). OSHA regulates workplace exposure to H_2S.

Other Pollutants

The State of California has established air quality standards for some pollutants not addressed by Federal standards. The ARB has established State standards for hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. The following section summarizes these pollutants and provides a description of the pollutants' physical properties, health and other effects, sources, and the extent of the problems.

Sulfates (SO_4^{2-}) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The ARB sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilator function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property.

Visibility Reducing Particles: Are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Vinyl Chloride (C_2H_3Cl or **VCM)** is a colorless gas that does not occur naturally. It is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC) which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Odors

Typically odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from the psychological (i.e. irritation, anger, or anxiety) to the physiological, including circulatory and respiratory effects, nausea, vomiting, and headache.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor and in fact an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Neither the state nor the federal governments have adopted rules or regulations for the control of odor sources. The SJVAPCD does not have an individual rule or regulation that specifically addresses odors; however, odors would be subject to SJVAPCD *Rule 4102, Nuisance*. Any actions related to odors would be based on citizen complaints to local governments and the SJVAPCD.

Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air, but due to their high toxicity, they may pose a threat to public health even at very low concentrations. Because there is no threshold level below which adverse health impacts are not expected to occur, TACs differ from criteria pollutants for which acceptable levels of exposure can be determined and for which state and federal governments have set ambient air quality standards. TACs, therefore, are not considered "criteria pollutants" under either the FCAA or the California Clean Air Act (CCAA), and are thus not subject to National or California ambient air quality standards (NAAQS and CAAQS, respectively). Instead, the U.S. EPA and the ARB regulate Hazardous Air Pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology to limit emissions. In conjunction with SJVAPCD rules, these federal and state statutes and regulations establish the regulatory framework for TACs. At the national levels, the U.S. EPA has established National Emission Standards for HAPs (NESHAPs), in accordance with the requirements of the FCAA and subsequent amendments. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

Within California, TACs are regulated primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. The following provides a summary of the primary TACs of concern within the State of California and related health effects:

Diesel Particulate Matter (DPM) was identified as a TAC by the ARB in August 1998. DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute approximately 40% of the statewide total, with an additional 57 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about 3 percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations. Emissions from these sources are from diesel-fueled internal combustion engines. Stationary sources that report DPM emissions also include heavy construction, manufacturers of asphalt paving materials and blocks, and diesel-fueled electrical generation facilities (ARB 2013).

In October 2000, the ARB issued a report entitled: "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles", which is commonly referred to as the Diesel Risk Reduction Plan (DRRP). The DRRP provides a mechanism for combating the DPM problem. The goal of the DRRP is to reduce concentrations of DPM by 85 percent by the year 2020, in comparison to year 2000 baseline emissions. The key elements of the DRRP are to clean up existing engines through engine retrofit emission control devices, to adopt stringent standards for new diesel engines, and to lower the sulfur content of diesel fuel to protect new, and very effective, advanced technology emission control devices on diesel engines. When fully implemented, the DRPP will significantly reduce emissions from both old and new diesel fueled motor vehicles and from stationary sources that burn diesel fuel. In addition to these strategies, the ARB continues to promote the use of alternative fuels and electrification. As a result of these actions, DPM concentrations and associated health risks in future years are projected to decline (ARB 2013, ARB 2000).

Exposure to DPM can have immediate health effects. DPM can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, Exposure to DPM also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, DPM has been identified as a carcinogen.

Acetaldehyde is a federal hazardous air pollutant. The ARB identified acetaldehyde as a TAC in April 1993. Acetaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Sources of acetaldehyde include emissions from combustion processes such as exhaust from mobile sources and fuel combustion from stationary internal combustion engines, boilers, and process heaters. A majority of the statewide acetaldehyde emissions can be attributed to mobile sources, including on-road motor vehicles, construction and mining equipment, aircraft, recreational boats, and agricultural equipment. Area sources of emissions include the burning of wood in residential fireplaces and wood stoves. The primary stationary sources of acetaldehyde are from fuel combustion from the petroleum industry (ARB 2013).

Acute exposure to acetaldehyde results in effects including irritation of the eyes, skin, and respiratory tract. Symptoms of chronic intoxication of acetaldehyde resemble those of alcoholism. The U.S. EPA has classified acetaldehyde as a probable human carcinogen. In California, acetaldehyde was classified on April 1, 1988, as a chemical known to the state to cause cancer (U.S. EPA 2014; ARB 2013).

Benzene is highly carcinogenic and occurs throughout California. The ARB identified benzene as a TAC in January 1985. A majority of benzene emitted in California (roughly 88 percent) comes from motor vehicles, including evaporative leakage and unburned fuel exhaust. These sources include on-road motor vehicles, recreational boats, off-road recreational vehicles, and lawn and garden equipment. Benzene is also formed as a partial combustion product of larger aromatic fuel components. To a lesser extent, industry-related stationary sources are also sources of benzene emissions. The primary stationary sources of reported benzene emissions are crude petroleum and natural gas mining, petroleum refining, and electric generation that involves the use of petroleum products. The primary area sources include residential combustion of various types such as cooking and water heating (ARB 2013).

Acute inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidences of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. The U.S. EPA has classified benzene as known human carcinogen for all routes of exposure (U.S. EPA 2014).

1,3-butadiene was identified by the ARB as a TAC in 1992. Most of the emissions of 1,3-butadiene are from incomplete combustion of gasoline and diesel fuels. Mobile sources account for a majority of the total statewide emissions. Additional sources include agricultural waste burning, open burning associated with forest management, petroleum refining, manufacturing of synthetics and man-made materials, and oil and gas extraction. The primary natural sources of 1,3-butadiene emissions are wildfires (ARB 2013).

Acute exposure to 1,3-butadiene by inhalation in humans results in irritation of the eyes, nasal passages, throat, and lungs. Epidemiological studies have reported a possible association between 1,3-butadiene exposure and cardiovascular diseases. Epidemiological studies of workers in rubber plants have shown an association between 1,3-butadiene exposure and increased incidence of leukemia. Animal studies have reported tumors at various sites from 1,3-butadiene exposure. In California, 1,3-butadiene has been identified as a carcinogen.

Carbon Tetrachloride was identified by the ARB as a TAC in 1987 under California's TAC program (ARB 2013). The primary stationary sources reporting emissions of carbon tetrachloride include chemical and allied product manufacturers and petroleum refineries. In the past, carbon tetrachloride was used for dry cleaning and as a grain-fumigant. Usage for these purposes is no longer allowed in the United States. Carbon tetrachloride has not been registered for pesticidal use in California since 1987. Also, the use of carbon tetrachloride in products to be used indoors has been discontinued in the United States. The statewide emissions of carbon tetrachloride are small (about 1.96 tons per year), and background concentrations account for most of the health risk (ARB 2013).

The primary effects of carbon tetrachloride in humans are on the liver, kidneys, and central nervous system. Human symptoms of acute inhalation and oral exposures to carbon tetrachloride include headache, weakness, lethargy, nausea, and vomiting. Acute exposures to higher levels and chronic (long-term) inhalation or oral exposure to carbon tetrachloride produces liver and kidney damage in humans. Human data on the carcinogenic effects of carbon tetrachloride are limited. Studies in animals have shown that ingestion of carbon tetrachloride increases the risk of liver cancer. In California, carbon tetrachloride has been identified as a carcinogen.

Hexavalent chromium was identified as a TAC in 1986. Sources of Hexavalent chromium include industrial metal finishing processes, such as chrome plating and chromic acid anodizing, and firebrick lining of glass furnaces. Other sources include mobile sources, including gasoline motor vehicles, trains, and ships (ARB 2013).

The respiratory tract is the major target organ for hexavalent chromium toxicity, for acute and chronic inhalation exposures. Shortness of breath, coughing, and wheezing were reported from a case of acute exposure to hexavalent chromium, while perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, and other respiratory effects have been noted from chronic exposure. Human studies have clearly established that inhaled hexavalent chromium is a human carcinogen, resulting in an increased risk of lung cancer. In California, hexavalent chromium has been identified as a carcinogen.

Para-Dichlorobenzene was identified by the ARB as a TAC in April 1993. The primary area-wide sources that have reported emissions of para-dichlorobenzene include consumer products such as non-aerosol insect repellants and solid/gel air fresheners. These sources contribute nearly all of the statewide para-dichlorobenzene emissions (ARB 2013).

Acute exposure to paradichlorobenzene via inhalation results in irritation to the eyes, skin, and throat in humans. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans. The U.S. EPA has classified para-dichlorobenzene as a possible human carcinogen.

Formaldehyde was identified by the ARB as a TAC in 1992. Formaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Photochemical oxidation is the largest source of formaldehyde concentrations in California ambient air. Directly emitted formaldehyde is a product of incomplete combustion. One of the primary sources of directly-emitted formaldehyde is vehicular exhaust. Formaldehyde is also used in resins, can be found in many consumer products as an antimicrobial agent, and is also used in fumigants and soil disinfectants. The primary area sources of formaldehyde emissions include wood burning in residential fireplaces and wood stoves (ARB 2013).

Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute and chronic inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. Formaldehyde is classified as a probable human carcinogen.

Methylene Chloride was identified by the ARB as a TAC in 1987. Methylene chloride is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic fabrication, and as a solvent in paint stripping operations. Paint removers account for the largest use of methylene chloride in California, where methylene chloride is the main ingredient in many paint stripping formulations. Plastic product manufacturers, manufacturers of synthetics, and aircraft and parts manufacturers are stationary sources reporting emissions of methylene chloride (ARB 2013).

The acute effects of methylene chloride inhalation in humans consist mainly of nervous system effects including decreased visual, auditory, and motor functions, but these effects are reversible once exposure ceases. The effects of chronic exposure to methylene chloride suggest that the central nervous system is a potential target in humans and animals. Human data are inconclusive regarding methylene chloride and cancer. Animal studies have shown increases in liver and lung cancer and benign mammary gland tumors following the inhalation of methylene chloride. In California, methylene chloride has been identified as a carcinogen.

Perchloroethylene was identified by the ARB as a TAC in 1991. Perchloroethylene is used as a solvent, primarily in dry cleaning operations. Perchloroethylene is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents. In California, the stationary sources that have reported emissions of perchloroethylene are dry cleaning plants, aircraft part and equipment manufacturers, and fabricated metal product manufacturers. The primary area sources include consumer products such as automotive brake cleaners and tire sealants and inflators (ARB 2013).

Acute inhalation exposure to perchloroethylene vapors can result in irritation of the upper respiratory tract and eyes, kidney dysfunction, and at lower concentrations, neurological effects, such as reversible mood and behavioral changes, impairment of coordination, dizziness, headaches sleepiness, and unconsciousness. Chronic inhalation exposure can result in neurological effects, including sensory symptoms such as headaches, impairments in cognitive and motor neurobehavioral functioning, and color vision decrements. Cardiac arrhythmia, liver damage, and possible kidney damage may also occur. In California, perchloroethylene has been identified as a carcinogen.

ASBESTOS

Asbestos is a term used for several types of naturally-occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. Serpentine rock often contains chrysotile asbestos. Serpentine rock, and its parent material, ultramafic rock, is abundant in the Sierra foothills, the Klamath Mountains, and Coast Ranges. The project site, however, is not located in an area of known ultramafic rock.

Asbestos is commonly found in ultramafic rock, including serpentine, and near fault zones. The amount of asbestos that is typically present in these rocks range from less than 1 percent up to about 25 percent, and sometimes more. Asbestos is released from ultramafic and serpentine rock when it is broken or crushed. This can happen when cars drive over unpaved roads or driveways which are surfaced with these rocks, when land is graded for building purposes, or at quarrying operations. It is also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time.

Additional sources of asbestos include building materials and other manmade materials. The most common sources are heat-resistant insulators, cement, furnace or pipe coverings, inert filler material, fireproof gloves and clothing, and brake linings. Asbestos has been used in the United States since the early 1900's; however, asbestos is no longer allowed as a constituent in most home products and materials. Many older buildings, schools, and homes still have asbestos containing products.

Naturally-occurring asbestos was identified by ARB as a TAC in 1986. The ARB has adopted two statewide control measures which prohibits the use of serpentine or ultramafic rock for unpaved surfacing and controls dust emissions from construction, grading, and surface mining in areas with these rocks. Various other laws have also been adopted, including laws related to the control of asbestos-containing materials during the renovation and demolition of buildings.

All types of asbestos are hazardous and may cause lung disease and cancer. Health risks to people are dependent upon their exposure to asbestos. The longer a person is exposed to asbestos and the greater the intensity of the exposure, the greater the chances for a health problem. Asbestos-related disease, such as lung cancer, may not occur for decades after breathing asbestos fibers. Cigarette smoking increases the risk of lung cancer from asbestos exposure.

VALLEY FEVER

Valley fever is an infection caused by the fungus Coccidioides. The scientific name for valley fever is "coccidioidomycosis," and it's also sometimes called "desert rheumatism." The term "valley fever" usually refers to Coccidioides infection in the lungs, but the infection can spread to other parts of the body in severe cases.

Coccidioides spores circulate in the air after contaminated soil and dust are disturbed by humans, animals, or the weather. The spores are too small to see without a microscope. When people breathe in the spores, they are at risk for developing valley fever. After the spores enter the lungs, the person's body temperature allows the spores to change shape and grow into spherules. When the spherules get large enough, they break open and release smaller pieces (called endospores) which can then potentially spread within the lungs or to other organs and grow into new spherules. In extremely rare cases, the fungal spores can enter the skin through a cut, wound, or splinter and cause a skin infection.

Symptoms of valley fever may appear between 1 and 3 weeks after exposure. Symptoms commonly include fatigue, coughing, fever, shortness of breath, headaches, night sweats, muscle aches and joint pain, and rashes on the upper body or legs.

Approximately 5 to 10 percent of people who get valley fever will develop serious or long-term problems in their lungs. In an even smaller percent of people (about 1 percent), the infection spreads from the lungs to other parts of the body, such as the central nervous system (brain and spinal cord), skin, or bones and joints. Certain groups of people may be at higher risk for developing the severe forms of valley fever, such as people who have weakened immune systems. The fungus that causes valley fever, Coccidioides, can't spread from the lungs between people or between people and animals. However, in extremely rare instances, a wound infection with Coccidioides can spread valley fever to someone else, or the infection can be spread through an organ transplant with an infected organ.

For many people, the symptoms of valley fever will go away within a few months without any treatment. Healthcare providers choose to prescribe antifungal medication for some people to try to reduce the severity of symptoms or prevent the infection from getting worse. Antifungal medication is typically given to people who are at higher risk for developing severe valley fever. The treatment typically occurs over a period of roughly 3 to 6 months. In some instances, longer treatment may be required. If valley fever develops into meningitis life-long antifungal treatment is typically necessary.

Scientists continue to study how weather and climate patterns affect the habitat of the fungus that causes valley fever. Coccidioides is thought to grow best in soil after heavy rainfall and then disperse into the air most effectively during hot, dry conditions. For example, hot and dry weather conditions have been shown to correlate with an increase in the number of valley fever cases in Arizona and in California. The ways in which climate change may be affecting the number of valley fever infections, as well as the geographic range of Coccidioides, isn't known yet, but is a subject for further research (CDC 2016).

REGULATORY FRAMEWORK

Air quality within the SJVAB is regulated by several jurisdictions including the U.S. EPA, ARB, and the SJVAPCD. Each of these jurisdictions develops rules, regulations, and policies to attain the goals or directives imposed upon them through legislation. Although U.S. EPA regulations may not be superseded, both state and local regulations may be more stringent.

FEDERAL

U.S. Environmental Protection Agency

At the federal level, the U.S. EPA has been charged with implementing national air quality programs. The U.S. EPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990.

Federal Clean Air Act

The FCAA required the U.S. EPA to establish National Ambient Air Quality Standards (NAAQS), and also set deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions. NAAQS are summarized in Table 2.

The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The FCAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The U.S. EPA has responsibility to review all state SIPs to determine conformance with the mandates of the FCAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If the U.S. EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) first authorized the U.S. EPA to regulate asbestos in schools and Public and Commercial buildings under Title II of the law, which is also known as the Asbestos Hazard Emergency Response Act (AHERA). AHERA requires Local Education Agencies (LEAs) to inspect their schools for ACBM and prepare management plans to reduce the asbestos hazard. The Act also established a program for the training and accreditation of individuals performing certain types of asbestos work.

National Emission Standards for Hazardous Air Pollutants

Pursuant to the FCAA of 1970, the U.S. EPA established the National Emission Standards for Hazardous Air Pollutants. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

STATE

California Air Resources Board

The ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act of 1988. Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts and air quality management districts, establishing California Ambient Air Quality Standards (CAAQS), which in many cases are more stringent than the NAAQS, and setting emissions standards for new motor vehicles. The CAAQS are summarized in Table 2. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

Table 1
Summary of Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards (Primary)
Ozone (O_3)	1-hour	0.09 ppm	–
	8-hour	0.070 ppm	0.070 ppm
Particulate Matter (PM_{10})	AAM	20 µg/m^3	–
	24-hour	50 µg/m^3	150 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3	12 µg/m^3
	24-hour	No Standard	35 µg/m^3
Carbon Monoxide (CO)	1-hour	20 ppm	35 ppm
	8-hour	9 ppm	9 ppm
	8-hour (Lake Tahoe)	6 ppm	–
Nitrogen Dioxide (NO_2)	AAM	0.030 ppm	53 ppb
	1-hour	0.18 ppm	100 ppb
Sulfur Dioxide (SO_2)	AAM	–	0.03 ppm
	24-hour	0.04 ppm	0.14 ppm
	3-hour	–	–
	1-hour	0.25 ppm	75 ppb
Lead	30-day Average	1.5 µg/m^3	–
	Calendar Quarter	–	1.5 µg/m^3
	Rolling 3-Month Average	–	0.15 µg/m^3
Sulfates	24-hour	25 µg/m^3	No Federal Standards
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m^3)	
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient: 0.23/kilometer-visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70%.	

** For more information on standards visit : https://ww3.arb.ca.gov/research/aaqs/aaqs2.pdf*
Source: ARB 2019a

California Clean Air Act

The CCAA requires that all air districts in the state endeavor to achieve and maintain CAAQS for Ozone, CO, SO_2, and NO_2 by the earliest practical date. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with authority to regulate indirect sources. Each district plan is required to either (1) achieve a five percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each non-attainment pollutant or its precursors, or (2) to provide for implementation of all feasible measures to reduce emissions. Any planning effort for air quality attainment would thus need to consider both state and federal planning requirements.

California Assembly Bill 170

Assembly Bill 170, Reyes (AB 170), was adopted by state lawmakers in 2003 creating Government Code Section 65302.1 which requires cities and counties in the San Joaquin Valley to amend their general plans to include data and analysis, comprehensive goals, policies and feasible implementation strategies designed to improve air quality.

Assembly Bills 1807 & 2588 - Toxic Air Contaminants

Within California, TACs are regulated primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics Hot Spots Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB designates a substance as a TAC. Existing sources of TACs that are subject to the Air Toxics Hot Spots Information and Assessment Act are required to: (1) prepare a toxic emissions inventory; (2) prepare a risk assessment if emissions are significant; (3) notify the public of significant risk levels; and (4) prepare and implement risk reduction measures.

California Air Resources Board's Truck and Bus Regulation

This regulation requires fleets that operate in California to reduce diesel truck and bus emissions by retrofitting or replacing existing engines. Amendments were adopted in December 2010 to provide more time for fleets to comply. The amended regulation required installation of PM retrofits beginning January 1, 2012 and replacement of older trucks starting January 1, 2015. By January 1, 2023, nearly all vehicles would need to have 2010 model year engines or equivalent.

The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses and privately and publicly owned school buses with a gross vehicle weight rating greater than 14,000 pounds. The regulation has provisions to provide extra credit for PM filters installed prior to July 2011, has delayed requirements for fleets with 3 or fewer vehicles, provisions for agricultural vehicles and other situations.

Airborne Toxic Control Measure to Limit School Bus Idling at Schools

ARB has approved an airborne toxic control measure (ATCM) that limits school bus idling and idling at or near schools to only when necessary for safety or operational concerns. The ATCM requires a driver of a school bus or vehicle, transit bus, or other commercial motor vehicle to manually turn off the bus or vehicle engine upon arriving at a school and to restart no more than 30 seconds before departing. A driver of a school bus or vehicle is subject to the same requirement when operating within 100 feet of a school and is prohibited from idling more than five minutes at each stop beyond schools, such as parking or maintenance facilities, school bus stops, or school activity destinations. A driver of a transit bus or other commercial motor vehicle is prohibited from idling more than five minutes at each stop within 100 feet of a school. Idling necessary for health, safety, or operational concerns is exempt from these restrictions. In addition, the ATCM requires a motor carrier of an affected bus or vehicle to ensure that drivers are informed of the idling requirements, track complaints and enforcement actions, and keep records of these driver education and tracking activities. This ATCM became effective in July 2003.

San Joaquin Valley Air Pollution Control District

The SJVAPCD is the agency primarily responsible for ensuring that NAAQS and CAAQS are not exceeded and that air quality conditions are maintained in the SJVAB, within which the proposed project is located. Responsibilities of the SJVAPCD include, but are not limited to, preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, issuing permits for stationary sources of air pollution, inspecting stationary sources of air pollution and responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing programs and regulations required by the FCAA and the CCAA. The SJVAPCD Rules and Regulations that are applicable to the proposed project include, but are not limited to, the following:

- *Regulation VIII (Fugitive Dust Prohibitions). Regulation VIII (Rules 8011-8081).* This regulation is a series of rules designed to reduce particulate emissions generated by human activity, including construction and demolition activities, carryout and trackout, paved and unpaved roads, bulk material handling and storage, unpaved vehicle/traffic areas, open space areas, etc.
- *Rule 4002 (National Emissions Standards for Hazardous Air Pollutants).* This rule may apply to projects in which portions of an existing building would be renovated, partially demolished or removed. With regard to asbestos, the NESHAP specifies work practices to be followed during renovation, demolition or other abatement activities when friable asbestos is involved. Prior to demolition activity, an asbestos survey of the existing structure may be required to identify the presence of any asbestos containing building materials (ACBM). Removal of identified ACBM must be removed by a certified asbestos contractor in accordance with CAL-OSHA requirements.
- *Rule 4102 (Nuisance).* Applies to any source operation that emits or may emit air contaminants or other materials.
- *Rule 4103 (Open Burning).* This rule regulates the use of open burning and specifies the types of materials that may be open burned. Section 5.1 of this rule prohibits the burning of trees and other vegetative (non-agricultural) material whenever the land is being developed for non-agricultural purposes.
- *Rule 4601 (Architectural Coatings).* Limits volatile organic compounds from architectural coatings.
- *Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations).* This rule applies to the manufacture and use of cutback, slow cure, and emulsified asphalt during paving and maintenance operations.
- *Rule 9510 (Indirect Source Review - ISR).* Requires developers of larger residential, commercial, recreational, and industrial projects to reduce smog-forming and particulate emissions from their projects' baselines. If project emissions still exceed the minimum baseline reductions, a project's developer will be required to mitigate the difference by paying an off-site fee to the District, which would then be used to fund clean-air projects. For projects subject to this rule, the ISR rule requires developers to mitigate and/or offset emissions sufficient to achieve: (1) 20-percent reduction of construction equipment exhaust NOx; (2) 45-percent reduction of construction equipment exhaust PM_{10}; (3) 33-percent reduction of operational NOx over 10 years; and (4) 50-percent reduction of operational PM_{10} over 10 years. SJVAPCD ISR applications must be filed "no later than applying for a final discretionary approval with a public agency."

REGULATORY ATTAINMENT DESIGNATIONS

Under the CCAA, ARB is required to designate areas of the state as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data does not support either an attainment or nonattainment designation. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The U.S. EPA designates areas for ozone, CO, and NO_2 as "does not meet the primary standards," "cannot be classified," or "better than national standards." For SO_2, areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, ARB terminology of attainment, nonattainment, and unclassified is more frequently used. The U.S. EPA uses the same sub-categories for nonattainment status: serious, severe, and extreme. In 1991, U.S. EPA assigned new nonattainment designations to areas that had previously been classified as Group I, II, or III for PM_{10} based on the likelihood that they would violate national PM_{10} standards. All other areas are designated "unclassified."

The state and national attainment status designations pertaining to the SJVAB are summarized in Table 2. The SJVAB is currently designated as a nonattainment area with respect to the state PM_{10} standard, ozone, and $PM_{2.5}$ standards. The SJVAB is designated nonattainment for the national 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the U.S. EPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan (SJVAPCD 2019).

Table 2
SJVAB Attainment Status Designations

Pollutant	National Designation	State Designation
Ozone, 1 hour	No Standard	Nonattainment/Severe
Ozone, 8 hour	Nonattainment/Extreme	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen dioxide	Attainment/Unclassified	Attainment
Sulfur dioxide	Attainment/Unclassified	Attainment
Lead (particulate)	No Designation/Classification	Attainment
Hydrogen sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility-reducing particulates	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

For more information visit website url: https://www.valleyair.org/aqinfo/attainment.htm.
Source: SJVAPCD 2019

AMBIENT AIR QUALITY

Air pollutant concentrations are measured at several monitoring stations in Fresno County. The Fresno-Drummond Street Monitoring Station is the closest representative monitoring site to the proposed project site with sufficient data to meet U.S. EPA and/or ARB criteria for quality assurance. This monitoring station monitors ambient concentrations of ozone, nitrogen dioxide, and PM_{10}. Ambient $PM_{2.5}$ monitoring data was obtained from the Fresno-Garland Monitoring Station. Ambient monitoring data was obtained for the last three years of available measurement data (i.e., 2015 through 2017) and are summarized in Table 3. As depicted, the state and national ozone, national $PM_{2.5}$, and state PM_{10} standards were exceeded on numerous occasions during the past 3 years.

SENSITIVE RECEPTORS

One of the most important reasons for air quality standards is the protection of those members of the population who are most sensitive to the adverse health effects of air pollution, termed "sensitive receptors." The term sensitive receptors refer to specific population groups, as well as the land uses where individuals would reside for long periods. Commonly identified sensitive population groups are children, the elderly, the acutely ill, and the chronically ill. Commonly identified sensitive land uses would include facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Residential dwellings, schools, parks, playgrounds, childcare centers, convalescent homes, and hospitals are examples of sensitive land uses.

Table 3
Summary of Ambient Air Quality Monitoring Data[1]

	2015	2016	2017
Ozone			
Maximum concentration (1-hour/8-hour average)	0.135/0.110	0.117/0.093	0.125/0.103
Number of days state/national 1-hour standard exceeded	12/1	13/0	8/1
Number of days state/national 8-hour standard exceeded	41/39	60/57	31/29
Nitrogen Dioxide (NO_2)			
Maximum concentration (1-hour average)	56.0	58.6	64.7
Annual average	11	NA	NA
Number of days state/federal standard exceeded	0	0	0
Suspended Particulate Matter (PM_{10})			
Maximum concentration (state/national)	116.7/120.7	86.3/88.3	120.5/115.6
Number of days state standard exceeded (measured/calculated[2])	13/80.3	17/98.9	17/111.6
Number of days national standard exceeded (measured/calculated[2])	0/0	0/0	0/0
Suspended Particulate Matter ($PM_{2.5}$)			
Maximum concentration (state/national)	75.2	52.7	86.0
Annual Average (state/national)	14.5	13.6	14.3
Number of days national standard exceeded	20	16	31

ppm = parts per million by volume, µg/m^3 = micrograms per cubic meter, NA=Not Available

1 *Ambient ozone, NO_2, and PM_{10} data was obtained from the Fresno-Drummond Street Monitoring Station. Ambient $PM_{2.5}$ data was obtained from the Fresno-Garland Monitoring Station.*

2 *Measured days are those days that an actual measurement was greater than the standard. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day.*

Source: ARB 2019b

Sensitive land uses located in the vicinity of the proposed project site consist predominantly of residential land uses. The nearest residential land uses are generally located to the north of the project site, north of E. Cambridge Avenue and E. Yale Avenue.

IMPACTS & MITIGATION MEASURES

METHODOLOGY

Short-term Impacts

Short-term construction emissions associated with the proposed project were calculated using the CalEEMod computer program. Emissions were quantified for demolition, sire preparation/grading, asphalt paving, facility construction, and application of architectural coatings. Detailed construction information, including construction schedules and equipment requirements, have not been identified for the proposed project. Default construction phases and equipment assumptions contained in the CalEEMod model were, therefore, relied upon for the calculation of construction-generated emissions. Due to anticipated reductions in future fleet-average emission rates, emissions for post-year 2020 conditions would likely be less. Modeling assumptions and output files are included in Appendix A of this report.

Long-term Impacts

Long-term operational emissions of criteria air pollutants associated with the proposed project were calculated using the CalEEMod computer program. Modeling was conducted based on traffic data derived, in part, from the *traffic analysis prepared for the proposed project* (JLB 2018). Mobile-source emissions were conservatively based on the default fleet distribution assumptions contained in the model. All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model. Modeling assumptions and output files are included in Appendix A of this report. Exposure to localized pollutant concentrations, including fugitive dust, mobile-source CO, and odors were qualitatively assessed. To be conservative, operation of the project was assumed to begin in 2020. Due to anticipated reductions in future fleet-average mobile-source and energy emission rates, emissions for post-year 2020 operational conditions would be less.

THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines Initial Study Checklist, a project would be considered to have a significant impact to climate change if it would:

a) Conflict with or obstruct implementation of the applicable air quality plan.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

c) Expose sensitive receptors to substantial pollutant concentrations.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

To assist local jurisdictions in the evaluation of air quality impacts, the SJVAPCD has published the Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2015). This guidance document includes recommended thresholds of significance to be used for the evaluation of short-term construction, long-term operational, odor, toxic air contaminant, and cumulative air quality impacts. Accordingly, the SJVAPCD-recommended thresholds of significance are used to determine whether implementation of the proposed project would result in a significant air quality impact. The thresholds of significance are summarized below.

- Short-term Emissions—Construction impacts associated with the proposed project would be considered significant if project-generated emissions would exceed 100 tons per year (TPY) of CO, 10 TPY of ROG or NO_X, 27 TPY of SO_X, or 15 TPY of PM_{10} or $PM_{2.5}$.
- Long-term Emissions—Operational impacts associated with the proposed project would be considered significant if project generated emissions would exceed 100 TPY of CO, 10 TPY of ROG or NO_X, 27 TPY of SO_X, or 15 TPY of PM_{10} or $PM_{2.5}$.
- Conflict with or Obstruct Implementation of Applicable Air Quality Plan—Due to the region's non-attainment status for ozone, $PM_{2.5}$, and PM_{10}, if project-generated emissions of ozone precursor pollutants (i.e., ROG and NO_x) or PM would exceed the SJVAPCD's significance thresholds, then the project would be considered to conflict with the attainment plans.
- Local Mobile-Source CO Concentrations—Local mobile source impacts associated with the proposed project would be considered significant if the project contributes to CO concentrations at receptor locations in excess of the CAAQS (i.e., 9.0 ppm for 8 hours or 20 ppm for 1 hour).
- Exposure to toxic air contaminants (TAC) would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual (i.e., maximum individual risk) would exceed 20 in 1 million or would result in a Hazard Index greater than 1.
- Odor impacts associated with the proposed project would be considered significant if the project has the potential to frequently expose members of the public to objectionable odors.

In addition to the above thresholds, the SJVAPCD also recommends the use of daily emissions thresholds for the evaluation of project impacts on localized ambient air quality conditions. Accordingly, the proposed project would also be considered to result in a significant contribution to localized ambient air quality if on-site emissions or ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, or SO_2 associated with either short-term construction or long-term operational activities would exceed a daily average of 100 pounds per day (lbs/day) for each of the pollutants evaluated (SJVAPCD 2015).

PROJECT IMPACTS

Impact AQ-A.	***Would the project conflict with or obstruct implementation of the applicable air quality plan?***

In accordance with SJVAPCD-recommended methodology for the assessment of air quality impacts, projects that result in significant air quality impacts at the project level are also considered to have a significant cumulative air quality impact. As noted in Impact AQ-B, short-term construction and long-term operational emissions would not exceed applicable thresholds. In addition, the proposed project's contribution to localized concentrations of emissions, including emissions of CO, TACs, and odors, are considered less than significant. However, as noted in Impact AQ-C, the proposed project could result in a significant contribution to localized PM concentrations for which the SJVAB is currently designated non-attainment. For this reason, implementation of the proposed project could conflict with air quality attainment or maintenance planning efforts. This impact would be considered ***potentially significant***.

Mitigation Measure: Implement Mitigation Measure AQ-1 (refer to Impact AQ-C).

Significance after Mitigation: With implementation of Mitigation Measure AQ-1 this impact would be considered less than significant.

Impact AQ-B.	***Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?***

The proposed project is located in the City of Fresno, which is within the SJVAB. The SJVAB is designated nonattainment for the national 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the U.S. EPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan (SJVAPCD 2019). Potential air quality impacts associated with the proposed project could potentially occur during project construction or operational phases. Short-term construction and long-term air quality impacts associated with the proposed project are discussed, as follows:

<u>Short-term Construction Emissions</u>

Short-term increases in emissions would occur during the construction process. Construction-generated emissions are of temporary duration, lasting only as long as construction activities occur, but have the potential to represent a significant air quality impact. The construction of the proposed project would result in the temporary generation of emissions associated with site grading and excavation, paving, motor vehicle exhaust associated with construction equipment, and worker trips; as well as, the movement of construction equipment on unpaved surfaces. Short-term construction emissions would result in increased emissions of ozone-precursor pollutants (i.e., ROG and NO_X) and emissions of PM. Emissions of ozone-precursors would result from the operation of on-road and off-road motorized vehicles and equipment. Emissions of airborne PM are largely dependent on the amount of ground disturbance associated with site grading and excavation activities and can result in increased concentrations of PM that can adversely affect nearby sensitive land uses. Estimated construction-generated annual emissions associated with the proposed project alternatives are summarized in Table 4.

As noted in Table 4, construction of the proposed project would generate maximum uncontrolled annual emissions of approximately 0.99 tons/year of ROG, 5.85 tons/year of NO_x, 4.46 tons/year of CO, 0.01 tons/year of SO_2, 0.81 tons/year of PM_{10}, and 0.42 tons/year of $PM_{2.5}$. Estimated construction-generated emissions would not exceed the SJVAPCD's significance thresholds of 10 tons/year of ROG, 10 tons/year of NO_x, or 15 tons/year PM_{10}.

Table 4
Annual Construction Emissions

Construction Phase	Uncontrolled Maximum Annual Emissions (TPY) [1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Construction Year 1						
Demolition	0.04	0.39	0.23	0.00	0.04	0.02
Site Preparation	0.02	0.23	0.11	0.00	0.10	0.06
Grading	0.07	0.82	0.51	0.00	0.17	0.09
Building Construction	0.11	0.95	0.74	0.00	0.11	0.06
Total:	0.24	2.38	1.59	0.00	0.42	0.22
Construction Year 2						
Building Construction	0.37	3.30	2.68	0.01	0.38	0.19
Paving	0.01	0.14	0.15	0.00	0.01	0.01
Architectural Coating	0.37	0.02	0.03	0.00	0.00	0.00
Total:	0.75	3.46	2.86	0.01	0.39	0.20
Maximum Annual Emissions:	0.99	5.85	4.46	0.01	0.81	0.42
Significance Thresholds:	*10*	*10*	*None*	*None*	*15*	*15*
Exceeds Thresholds/Significant Impact?:	*No*	*No*	*No*	*No*	*No*	*No*

1. Based on CalEEMod computer modeling. Totals may not sum due to rounding. Does not include emission control measures. Construction start date has not yet been identified. To be conservative, emissions modeling assumes construction could begin in 2019. Future year emissions would be less.
Refer to Appendix A for modeling results and assumptions.

Estimated average-daily on-site construction emissions are summarized in Table 5. As noted in Table 5, construction of the proposed project would generate maximum on-site emissions of approximately 40.07 lbs/day of ROG, 35.78 lbs/day of NO_x, 32.11 lbs/day of CO, 11.05 lbs/day of PM_{10}, and 5.79 lbs/day of $PM_{2.5}$. The highest average-daily emissions would generally occur during the demolition of the existing structures and site grading activities. Emissions of SO_2 would be negligible (e.g., less than 0.1 tons/year). Average-daily on-site construction emissions would not exceed the SJVAPCD's recommended localized ambient air quality significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated.

Short-term construction of the proposed project would not result in a significant impact to regional or local air quality conditions. Furthermore, it is important to note that project construction, including excavation and grading activities, would be required to comply with SJVPACD Regulation VIII (Fugitive PM_{10} Prohibitions). Mandatory compliance with SJVAPCD Regulation VIII would further reduce emissions of fugitive dust from the project site and minimize the project's potential to adversely affect nearby sensitive receptors. With compliance with SJVAPCD Regulation VIII, emissions of PM would be further reduced by approximately 50 percent, or more. Given that project-generated emissions would not exceed applicable SJVAPCD significance thresholds, this impact would be considered ***less than significant***.

Table 5
Daily On-Site Construction Emissions

Construction Phase	Uncontrolled Daily Emissions (lbs/day) [1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition	3.51	35.78	22.06	0.04	3.93	1.99
Site Preparation	1.45	15.19	7.35	0.01	6.82	4.05
Grading	4.74	54.52	33.38	0.06	11.05	5.79
Building Construction – Year 1	3.37	30.04	24.46	0.04	1.84	1.73
Building Construction – Year 2	1.97	17.80	15.63	0.02	1.04	0.97
Paving	1.36	14.07	14.65	0.02	0.75	0.69
Architectural Coating	36.74	1.68	1.83	0.00	0.11	0.11
Maximum Daily On-site Emissions:	40.07	35.78	32.11	0.05	11.05	5.79
Significance Thresholds:	*100*	*100*	*100*	*100*	*100*	*100*
Exceeds Thresholds/Significant Impact?:	*No*	*No*	*No*	*No*	*No*	*No*

1. Based on CalEEMod computer modeling. Totals may not sum due to rounding. Does not include emission control measures, including dust control per Regulation VIII.
2. Average daily on-site emissions are based on total on-site emissions divided by the total number of construction days.
3. Maximum daily on-site emissions assumes building construction, paving, and architectural coating application could potentially occur simultaneously.
Refer to Appendix A for modeling results and assumptions.

Long-term Operational Emissions

Estimated annual operational emissions for the proposed project are summarized in Table 6. As depicted, the proposed project would result in total operational emissions of approximately 1.24 tons/year of ROG, 7.53 tons/year of NO_X, 5.84 tons/year of CO, 1.47 tons/year of PM_{10}, and 0.43 tons/year of $PM_{2.5}$ during the initial year of operation. Emissions of SO_2 would be negligible (i.e., less than 0.1 tons/year). It is important to note, however, that these estimates include mobile-source emissions associated with existing operations, which would be relocated with project implementation. When taking into account existing vehicle trips, the proposed expansion would result in net increases of approximately 0.68 tons/year of ROG, 0.95 tons/year of NO_X, 0.71 tons/year of CO, 0.14 tons/year of PM_{10}, and 0.05 tons/year of $PM_{2.5}$ during the initial year of operation. Operational emissions would be projected to decline in future years, with improvements in fuel-consumption emissions standards. Operational emissions would not exceed SJVAPCD's mass-emissions significance thresholds.

Estimated average-daily on-site operational emissions are also summarized in Table 7. Average-daily on-site operational emissions would be largely associated with area sources (e.g., landscape maintenance activities and use of consumer products) and the use of natural-gas fired appliances. Average-daily on-site emissions would total approximately 6.18 lbs/day of ROG and approximately 1.1 lbs/day of NO_X and CO. Average-daily on-site emissions of other pollutants would be negligible (i.e., less than 0.1 lbs/day). Average-daily on-site emissions would not exceed the SJVAPCD's recommended localized ambient air quality significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated.

Long-term operation of the proposed project would not result in a significant impact to regional or local air quality conditions. It is important to note that estimated operational emissions are conservatively based on the default vehicle fleet distribution assumptions contained in the model, which include contributions from medium and heavy-duty trucks. Mobile sources associated with the proposed land uses would consist predominantly of light-duty vehicles. As a result, actual mobile source emissions would likely be less than estimated. This impact is considered ***less than significant***.

Table 6
Long-term Operational Emissions (Unmitigated)

Season	Uncontrolled Annual Emissions (tons/year)[1]					
	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Area Source	0.60	0.00	0.02	0.00	0.00	0.00
Energy Use	0.02	0.13	0.11	0.00	0.01	0.01
Mobile Source[2]	0.63	7.40	5.71	0.03	1.46	0.42
Total:	1.24	7.53	5.84	0.03	1.47	0.43
Less Existing Mobile-Source Emissions[3]:	-0.56	-6.58	-5.13	-0.02	-1.33	-0.38
Net Increase:	0.68	0.95	0.71	0.01	0.14	0.05
Significance Thresholds (tons):	*10*	*10*	*None*	*None*	*15*	*None*
Exceeds Thresholds/Significant Impact?:	*No*	*No*	--	--	*No*	--
Average Daily On-site Emissions (lbs)[4]:	*6.18*	*1.11*	*1.11*	*0.01*	*0.09*	*0.09*
Significance Thresholds (lbs):	*100*	*100*	*100*	*100*	*100*	*100*
Exceeds Thresholds/Significant Impact?:	*No*	*No*	*No*	*No*	*No*	*No*

1. Emissions were calculated using the CalEEMod computer program. Does not include implementation of emissions control measures.
2. Fleet distribution data for the project is not available. Mobile-source emissions are conservatively based on default vehicle fleet distribution for Fresno County, which includes all vehicle types/classifications, including medium and heavy-duty vehicles. Actual emissions would likely be lower. To be conservative, does not include reductions in employee motor vehicle trips anticipated to occur with project implementation.
3. Reflects vehicle trips already associated with existing operations that would be relocated with project implementation.
4. Based on calculated annual operational emissions from area sources and an average of 240 operational days annually.
Totals may not sum due to rounding.
Refer to Appendix A for modeling assumptions and results.

Impact AQ-C. Would the project expose sensitive receptors to substantial pollutant concentrations?

Sensitive land uses located in the vicinity of the proposed project site consist predominantly of residential land uses. The nearest residential land uses are located adjacent to the western boundary of the project site. Residential land uses are also located to the south and east of the project site (refer to Figure 1). Long-term operational and short-term construction activities and emission sources that could adversely impact these nearest sensitive receptors are discussed, as follows:

Long-term Operation

Localized Mobile-Source CO Emissions

Carbon monoxide is the primary criteria air pollutant of local concern associated with the proposed project. Under specific meteorological and operational conditions, such as near areas of heavily congested vehicle traffic, CO concentrations may reach unhealthy levels. If inhaled, CO can be adsorbed easily by the blood stream and can inhibit oxygen delivery to the body, which can cause significant health effects ranging from slight headaches to death. The most serious effects are felt by individuals susceptible to oxygen deficiencies, including people with anemia and those suffering from chronic lung or heart disease.

Mobile-source emissions of CO are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. For this reason, modeling of mobile-source CO concentrations is typically recommended for sensitive land uses located near signalized roadway intersections that are projected to operate at unacceptable levels of service (i.e., LOS E or F). Localized CO concentrations associated with the proposed project would be considered less-than-significant impact if: (1) traffic generated by the proposed project would not result in deterioration of a signalized intersection to a LOS of E or F; or (2) the project would not contribute additional traffic to a signalized intersection that already operates at LOS of E or F.

Signalized intersections in the project area include the intersections of Blackstone Avenue/Weldon Avenue and Blackstone Avenue/McKinley Avenue. With implementation of the proposed traffic improvements, these intersections are projected to operate at LOS D, or better, for existing-plus-project, near-term, and future cumulative conditions (JBL 2019). In comparison to the CO screening criteria, implementation of the proposed project would not result in or contribute to unacceptable levels of service (i.e., LOS E, or worse) at nearby signalized intersections. As a result, the proposed project would not be anticipated to contribute substantially to localized CO concentrations that would exceed applicable standards. For this reason, this impact would be considered ***less than significant***.

Toxic Air Contaminants

Implementation of the proposed project would not result in the long-term operation of any major onsite stationary sources of TACs, nor would project implementation result in a significant increase in diesel-fueled vehicles traveling along area roadways. In addition, with implementation of the proposed project student facilities (e.g., science building, child development center) would be largely contained within the existing campus boundaries. No major stationary sources of TACs were identified in the project vicinity that would result in increased exposure of students or staff to TACs. For these reasons, long-term increases in exposure to TACs would be considered ***less than significant***.

Short-term Construction

Naturally Occurring Asbestos

Naturally-occurring asbestos, which was identified by ARB as a TAC in 1986, is located in many parts of California and is commonly associated with ultramafic rock. The project site is not located near any areas that are likely to contain ultramafic rock (DOC 2000). As a result, risk of exposure to asbestos during the construction process would be considered ***less than significant***.

Asbestos-Containing Materials

Demolition activities can have potential negative air quality impacts, including issues surrounding proper handling, demolition, and disposal of asbestos containing material (ACM). Asbestos containing materials could be encountered during demolition of existing buildings, particularly older structures constructed prior to 1970. Asbestos can also be found in various building products, including (but not limited to) utility pipes/pipelines (transite pipes or insulation on pipes). If a project will involve the disturbance or potential disturbance of ACM, various regulatory requirements may apply, including the requirements stipulated in the National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M-Asbestos NESHAP). These requirements include but are not limited to: 1) notification, within at least 10 business days of activities commencing, to the APCD, 2) an asbestos survey conducted by a Certified Asbestos Consultant, and, 3) applicable removal and disposal requirements of identified ACM.

The proposed project would include the demolition of existing onsite structures. The demolition of existing structures may result in disturbance of ACM. This impact is considered ***potentially significant***.

Lead-Coated Materials

Demolition of structures coated with lead based paint can have potential negative air quality impacts and may adversely affect the health of nearby individuals. Lead-based paints could be encountered during demolition of existing buildings, particularly older structures constructed prior to 1978. Improper demolition can result in the release of lead containing particles from the site. Sandblasting or removal of paint by heating with a heat gun can result in significant emissions of lead. In such instances, proper abatement of lead before demolition of these structures must be performed in order to prevent the release of lead from the site. Federal and State lead regulations, including the Lead in Construction Standard (29CFR1926.62) and California Code of Regulations (CCR Title 8, Section 1532.1, Lead) regulate disturbance of lead containing materials during construction, demolition, and maintenance-related activities. Depending on removal method, a SJVAPCD permit may be required.

The proposed project would include the demolition of existing onsite structures. The demolition of existing structures may result in disturbance of lead containing materials. This impact is considered ***potentially significant***.

Diesel-Exhaust Emissions

Implementation of the proposed project would result in the generation of DPM emissions during construction associated with the use of off-road diesel equipment for site grading and excavation, paving and other construction activities. Health-related risks associated with diesel-exhaust emissions are primarily associated with long-term exposure and associated risk of contracting cancer. For residential land uses, the calculation of cancer risk associated with exposure of to TACs are typically calculated based on a 25 to 30-year period of exposure. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Assuming that construction activities involving the use of diesel-fueled equipment would occur over an approximate 18-month period, project-related construction activities would constitute less than six percent of the typical exposure period. As a result, exposure to construction-generated DPM would not be anticipated to exceed applicable thresholds (i.e., incremental increase in cancer risk of 20 in one million). In addition, implementation of Mitigation Measure AQ-1 would result in further reductions of on-site DPM emissions. For these reasons, this impact would be considered ***less than significant***.

Localized PM Concentrations

Fugitive dust emissions would be primarily associated with building demolition, site preparation and grading, and vehicle travel on unpaved and paved surfaces. On-site off-road equipment and trucks would also result in short-term emissions of diesel-exhaust PM, which could contribute to elevated localized concentration at nearby receptors. Uncontrolled emissions of fugitive dust may also contribute to increased occurrences of Valley Fever and potential increases in nuisance impacts to nearby receptors. For these reasons, localized uncontrolled concentrations of construction-generated PM would be considered to have a ***potentially-significant*** impact.

Mitigation Measure AQ-1: The following measures shall be implemented to reduce potential expose of nearby sensitive receptors to localized pollutant concentrations associated with project construction:

1. Demolition of onsite structures shall comply with all applicable regulatory requirements, including, but not limited to, SJVAPCD Rule 4002 (NESHAP), and National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M - asbestos NESHAP), Lead in Construction Standard (29CFR1926.62) and California Code of Regulations Title 8, Section 1532.1, Lead. These requirements may include: 1) responsible agency notifications, 2) lead-based paint or asbestos surveys, and, 3) applicable removal and disposal requirements. More information on asbestos-containing materials and applicable regulatory requirements can be found at website url: https://www.valleyair.org/newsed/asbestos.pdf. Additional information regarding lead-based paint and applicable regulatory requirements can be found at website urls: https://www.epa.gov/lead/lead-abatement-inspection-and-risk-assessment and https://www.dir.ca.gov/title8/1532_1.html.

2. On-road diesel vehicles shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles:

    a. Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location, except as noted in Subsection (d) of the regulation; and,

    b. Shall not operate a diesel-fueled auxiliary power system to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation.

3. Off-road diesel equipment shall comply with the 5-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use off-Road Diesel regulation. The specific requirements and exceptions in the regulations can be reviewed at the following web sites: www.arb.ca.gov/msprog/truck-idling/2485.pdf and ww.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf.
4. Signs shall be posted at the project site construction entrance to remind drivers and operators of the state's 5 minute idling limit.
5. To the extent available, replace fossil-fueled equipment with alternatively-fueled (e.g., natural gas) or electrically-driven equivalents.
6. Construction truck trips shall be scheduled, to the extent feasible, to occur during non-peak hours and truck haul routes shall be selected to minimize impacts to nearby residential dwellings.
7. The burning of vegetative material shall be prohibited.
8. Low VOC-content (50 grams per liter, or less) exterior and interior building paints shall be used. To the extent locally available, use prefinished/pre-colored materials.
9. The proposed project shall comply with SJVAPCD Regulation VIII for the control of fugitive dust emissions. Regulation VIII can be obtained on the SJVAPCD's website at website URL: https://www.valleyair.org/rules/1ruleslist.htm. At a minimum, the following measures shall be implemented:
    a. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
    b. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
    c. All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
    d. With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition.
    e. When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.
    f. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)
    g. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
    h. On-road vehicle speeds on unpaved surfaces of the project site shall be limited to 15 mph.
    i. Sandbags or other erosion control measures shall be installed sufficient to prevent silt runoff to public roadways from sites with a slope greater than one percent.
    j. Excavation and grading activities shall be suspended when winds exceed 20 mph (Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation).
10. The above measures for the control of construction-generated emissions shall be included on site grading and construction plans.

Significance After Mitigation

Implementation of Mitigation Measure AQ-1would include measures to ensure compliance with applicable regulatory requirements pertaining to the handling and disposal of hazardous materials that may be encountered during the construction process (e.g., asbestos containing materials, lead-based paints). Additional measures have also been included to reduce construction-generated emissions that could contribute to increases in localized pollutant concentrations at nearby sensitive receptors. These measures include SJVAPCD-recommended measures, which would help to ensure compliance with applicable SJVAPCD rules and regulations. With mitigation, this impact would be considered ***less than significant***.

Impact AQ-D.	***Would the project result in other emissions (such as those leading to odors) affecting a substantial number of people?***

Other emissions potentially associated with the proposed project would be predominantly associated to the generation of odors during project construction. The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies.

Construction of the proposed project would involve the use of a variety of gasoline or diesel-powered equipment that would emit exhaust fumes. Exhaust fumes, particularly diesel-exhaust, may be considered objectionable by some people. In addition, pavement coatings and architectural coatings used during project construction would also emit temporary odors. However, construction-generated emissions would occur intermittently throughout the workday and would dissipate rapidly within increasing distance from the source. As a result, short-term construction activities would not expose a substantial number of people to frequent odorous emissions. In addition, no major sources of odors have been identified in the project area. This impact would be considered ***less than significant***.

GREENHOUSE GASES AND CLIMATE CHANGE

EXISTING SETTING

To fully understand global climate change, it is important to recognize the naturally occurring "greenhouse effect" and to define the greenhouse gases (GHGs) that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Primary GHGs attributed to global climate change, are discussed, as follows:

- **Carbon Dioxide**. Carbon dioxide (CO_2) is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere (U.S. EPA 2018).

- **Methane**. Methane (CH_4) is a colorless, odorless gas that is not flammable under most circumstances. CH_4 is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (enteric fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane's atmospheric lifetime is about 12 years (U.S. EPA 2018).

- **Nitrous Oxide**. Nitrous oxide (N_2O) is a clear, colorless gas with a slightly sweet odor. N_2O is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 114 years (U.S. EPA 2018).

- **Hydrofluorocarbons.** Hydrofluorocarbons (HFCs) are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 270 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes of less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years) (U.S. EPA 2018).

- **Perfluorocarbons.** Perfluorocarbons (PFCs) are colorless, highly dense, chemically inert, and nontoxic. There are seven PFC gases: perfluoromethane (CF_4), perfluoroethane (C_2F_6), perfluoropropane (C_3F_8), perfluorobutane (C_4F_{10}), perfluorocyclobutane (C_4F_8), perfluoropentane (C_5F_{12}), and perfluorohexane (C_6F_{14}). Natural geological emissions have been responsible for the PFCs that have accumulated in the atmosphere in the past; however, the largest current source is aluminum production, which releases CF_4 and C_2F_6 as byproducts. The estimated atmospheric lifetimes for PFCs ranges from 2,600 to 50,000 years (U.S. EPA 2018).

- **Nitrogen Trifluoride**. Nitrogen trifluoride (NF_3) is an inorganic, colorless, odorless, toxic, nonflammable gas used as an etchant in microelectronics. Nitrogen trifluoride is predominantly employed in the cleaning of the plasma-enhanced chemical vapor deposition chambers in the production of liquid crystal displays and silicon-based thin film solar cells. It has a global warming potential of 16,100 carbon dioxide equivalents (CO_2e). While NF_3 may have a lower global warming potential than other chemical etchants, it is still a potent GHG. In 2009, NF_3 was listed by California as a high global warming potential GHG to be listed and regulated under Assembly Bill (AB) 32 (Section 38505 Health and Safety Code).

- **Sulfur Hexafluoride**. Sulfur hexafluoride (SF_6) is an inorganic compound that is colorless, odorless, nontoxic, and generally nonflammable. SF_6 is primarily used as an electrical insulator in high voltage equipment. The electric power industry uses roughly 80 percent of all SF_6 produced worldwide. Leaks of SF_6 occur from aging equipment and during equipment maintenance and servicing. SF_6 has an atmospheric life of 3,200 years (U.S. EPA 2018).

- **Black Carbon**. Black carbon is the strongest light-absorbing component of particulate matter (PM) emitted from burning fuels such as coal, diesel, and biomass. Black carbon contributes to climate change both directly by absorbing sunlight and indirectly by depositing on snow and by interacting with clouds and affecting cloud formation. Black carbon is considered a short-lived species, which can vary spatially and, consequently, it is very difficult to quantify associated global-warming potentials. The main sources of black carbon in California are wildfires, off-road vehicles (locomotives, marine vessels, tractors, excavators, dozers, etc.), on-road vehicles (cars, trucks, and buses), fireplaces, agricultural waste burning, and prescribed burning (planned burns of forest or wildlands) (CCAC 2018, U.S. EPA 2018).

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Often, estimates of GHG emissions are presented in CO_2e, which weight each gas by its global warming potential (GWP). Expressing GHG emissions in CO_2e takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. Table 7 provides a summary of the GWP for GHG emissions of typical concern with regard to community development projects, based on a 100-year time horizon. As indicated, Methane traps over 25 times more heat per molecule than CO_2, and N_2O absorbs roughly 298 times more heat per molecule than CO_2. Additional GHG with high GWP include Nitrogen trifluoride, Sulfur hexafluoride, Perfluorocarbons, and black carbon.

Table 7
Global Warming Potential for Greenhouse Gases

Greenhouse Gas	Global Warming Potential (100-year)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Dioxide (N_2O)	298

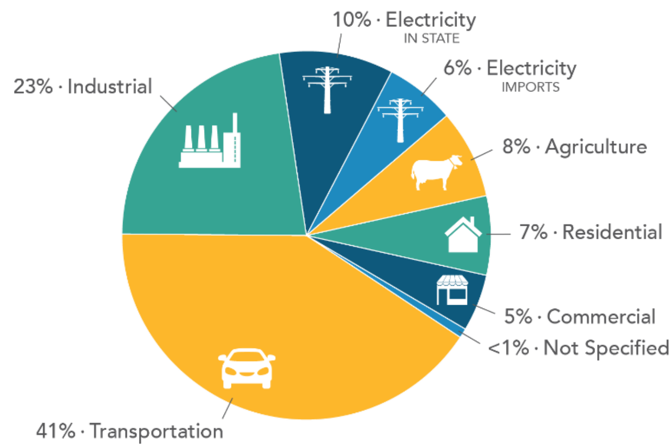
**Based on IPCC GWP values for 100-year time horizon*
Source: IPCC 2007

SOURCES OF GHG EMISSIONS

On a global scale, GHG emissions are predominantly associated with activities related to energy production; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. World-wide, energy production including the burning of coal, natural gas, and oil for electricity and heat are typically considered the largest single sources of global GHG emissions.

In 2016, GHG emissions within California totaled 429.4 million metric tons of carbon dioxide equivalents ($MMTCO_2e$). Within California, the transportation sector is the largest contributor, accounting for roughly 41 percent of the total state-wide GHG emissions. Emissions associated with the industrial sector are the second largest contributor, totaling approximately 23 percent. Emissions from in-state electricity generation, imported electricity, agriculture, residential, and commercial uses constitute the remaining major sources on GHG emissions. In comparison to the year 2014 emissions inventory, overall GHG emissions in California decreased by 12 MMTCO2e. The State of California GHG emissions inventory for year 2016, by main economic sector, is depicted in Figure 3 (ARB 2019c).

Figure 3
State of California Greenhouse Gases Emissions Inventory by Main Economic Sector



Emissions inventory is categorized based on main economic sector. "Not Specified" includes sources that could not be attributed to an individual sector, such as evaporative losses and emissions from use of ozone-depleting substances.
Source: ARB 2019c

Short-Lived Climate Pollutants

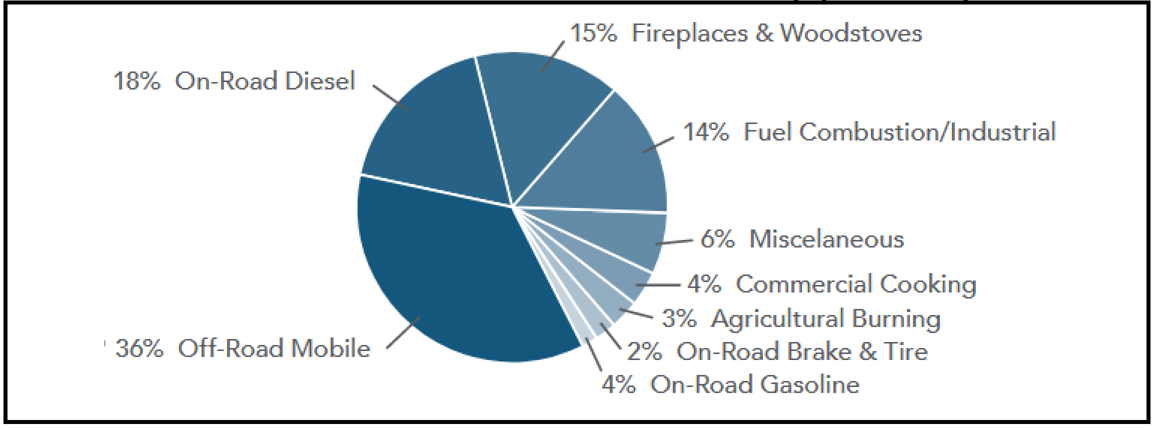
Short-lived climate pollutants (SLCPs), such as black carbon, fluorinated gases, and methane also have a dramatic effect on climate change. Though short lived, these pollutants create a warming influence on the climate that is many times more potent than that of carbon dioxide.

As part of the ARB's efforts to address SLCPs, the ARB has developed a statewide emission inventory for black carbon. The black carbon inventory will help support implementation of the SLCP Strategy, but it is not part of the State's GHG Inventory that tracks progress towards the State's climate targets. The most recent inventory for year 2013 conditions is depicted in Figure 4. As depicted, off-road mobile sources account for a majority of black carbon emissions totaling roughly 36 percent of the inventory. Other major anthropogenic sources of black carbon include on-road transportation, residential wood burning, fuel combustion, and industrial processes (ARB 2017).

EFFECTS OF GLOBAL CLIMATE CHANGE

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, increased air pollution episodes, and the consequence of these effects on the economy.

Figure 4
California Black Carbon Emissions Inventory (Year 2013)



Source: ARB 2017

Within California, climate changes would likely alter the ecological characteristics of many ecosystems throughout the state. Such alterations would likely include increases in surface temperatures and changes in the form, timing, and intensity of precipitation. For instance, historical records are depicting an increasing trend toward earlier snowmelt in the Sierra Nevada. This snowpack is a principal supply of water for the state, providing roughly 50 percent of state's annual runoff. If this trend continues, some areas of the state may experience an increased danger of floods during the winter months and possible exhaustion of the snowpack during spring and summer months. An earlier snowmelt would also impact the State's energy resources. Currently, approximately 20 percent of California's electricity comes from hydropower. An early exhaustion of the Sierra snowpack, may force electricity producers to switch to more costly or non-renewable forms of electricity generation during spring and summer months. A changing climate may also impact agricultural crop yields, coastal structures, and biodiversity. As a result, resultant changes in climate will likely have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry (ARB 2017).

Regulatory Framework

Federal

Executive Order 13514

Executive Order 13514 is focused on reducing GHGs internally in federal agency missions, programs, and operations. In addition, the executive order directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

On April 2, 2007, in Massachusetts v. U.S. EPA, 549 U.S. 497 (2007), the Supreme Court found that GHGs are air pollutants covered by the FCAA and that the U.S. EPA has the authority to regulate GHG. The Court held that the U.S. EPA Administrator must determine whether or not emissions of GHGs from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- Endangerment Finding: The Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.

- Cause or Contribute Finding: The Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industry or other entities, this action was a prerequisite to finalizing the U.S. EPA's Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles, which was published on September 15, 2009. On May 7, 2010 the final Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards was published in the Federal Register.

U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations. These steps were outlined by President Obama in a Presidential Memorandum on May 21, 2010.

The final combined U.S. EPA and NHTSA standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile (the equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements). Together, these standards will cut GHG emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016). On August 28, 2012, U.S. EPA and NHTSA issued their joint rule to extend this national program of coordinated GHG and fuel economy standards to model years 2017 through 2025 passenger vehicles.

State

Assembly Bill 1493

AB 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the ARB to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as Pavley I. The California Legislature declared in AB 1493 that global warming is a matter of increasing concern for public health and the environment. It cites several risks that California faces from climate change, including a reduction in the state's water supply; an increase in air pollution caused by higher temperatures; harm to agriculture; an increase in wildfires; damage to the coastline; and economic losses caused by higher food, water, energy, and insurance prices. The bill also states that technological solutions to reduce GHG emissions would stimulate California's economy and provide jobs. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as the State is authorized to do under the FCAA, to allow the State to require reduced tailpipe emissions of CO_2. In late 2007, the U.S. EPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the State brought suit against the U.S. EPA related to this denial.

In January 2009, President Obama instructed the U.S. EPA to reconsider the Bush Administration's denial of California's and 13 other states' requests to implement global warming pollution standards for cars and trucks. In June 2009, the U.S. EPA granted California's waiver request, enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

In 2009, President Obama announced a national policy aimed at both increasing fuel economy and reducing GHG pollution for all new cars and trucks sold in the US. The new standards would cover model years 2012 to 2016 and would raise passenger vehicle fuel economy to a fleet average of 35.5 miles per gallon by 2016. When the national program takes effect, California has committed to allowing automakers who show compliance with the national program to also be deemed in compliance with state requirements. California is committed to further strengthening these standards beginning in 2017 to obtain a 45 percent GHG reduction from the 2020 model year vehicles.

Executive Order No. S-3-05

Executive Order S-3-05 (State of California) proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The secretary will also submit biannual reports to the governor and state legislature describing (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the secretary of CalEPA created a Climate Action Team made up of members from various state agencies and commissions. The Climate Action Team released its first report in March 2006 and continues to release periodic reports on progress. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32 - California Global Warming Solutions Act of 2006

AB 32 (Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include CO_2, CH_4, N_2O, HFCs, PFCs, NF_3, and SF_6. The reduction to 1990 levels will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Climate Change Scoping Plan

In October 2008, ARB published its *Climate Change Proposed Scoping Plan*, which is the State's plan to achieve GHG reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementing the Low Carbon Fuel Standard program, implementation of energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems, and developing a renewable portfolio standard for electricity production.

The Scoping Plan states that land use planning and urban growth decisions will play important roles in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. With regard to land use planning, the Scoping Plan expects approximately 5.0 MMT CO_2e will be achieved associated with implementation of Senate Bill 375, which is discussed further below.

The initial Scoping Plan was first approved by ARB on December 11, 2008 and is updated every five years. The first update of the Scoping Plan was approved by the ARB on May 22, 2014, which looked past 2020 to set mid-term goals (2030-2035) on the road to reaching the 2050 goals., The most recent update released by ARB is the *2017 Climate Change Scoping Plan*, which was released In November 2017. The *2017 Climate Change Scoping Plan* incorporates strategies for achieving the 2030 GHG-reduction target established in SB 32 and EO B-30-15.

Senate Bill 1078 and Governor's Order S-14-08 (California Renewables Portfolio Standards)

Senate Bill 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. Executive Order S-14-08 was later superseded by Executive Order S-21-09 on September 15, 2009. Executive Order S-21-09 directed the ARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. Statute SB X1-2 superceded this Executive Order in 2011, which obligated all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020.

ARB is required by current law, AB 32 of 2006, to regulate sources of GHGs to meet a state goal of reducing GHG emissions to 1990 levels by 2020 and an 80 percent reduction of 1990 levels by 2050. The California Energy Commissions and California Public Utilities Commission serve in advisory roles to help ARB develop the regulations to administer the 33 percent by 2020 requirement. ARB is also authorized to increase the target and accelerate and expand the time frame.

Mandatory Reporting of GHG Emissions

The California Global Warming Solutions Act (AB 32, 2006) requires the reporting of GHGs by major sources to the ARB. Major sources required to report GHG emissions include industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

Cap-and-Trade Regulation

The cap-and-trade regulation is a key element in California's climate plan. It sets a statewide limit on sources responsible for 85 percent of California's GHG emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The cap-and-trade rules came into effect on January 1, 2013, and apply to large electric power plants and large industrial plants. In 2015, fuel distributors, including distributors of heating and transportation fuels, also became subject to the cap-and-trade rules. At that stage, the program will encompass around 360 businesses throughout California and nearly 85 percent of the state's total GHG emissions.

Under the cap-and-trade regulation, companies must hold enough emission allowances to cover their emissions and are free to buy and sell allowances on the open market. California held its first auction of GHG allowances on November 14, 2012. California's GHG cap-and-trade system is projected to reduce GHG emissions to 1990 levels by the year 2020 and would achieve an approximate 80 percent reduction from 1990 levels by 2050.

Senate Bill 32

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG-reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs the ARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target.

Senate Bill 375

SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that MPOs regional transportation plan. ARB, in consultation with MPOs, establishes regional reduction targets for GHGs emitted by passenger cars and light trucks for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, funding for transportation projects may be withheld.

California Building Code

The California Building Code (CBC) contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Code is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

Green Building Standards

In essence, green buildings standards are indistinguishable from any other building standards. Both standards are contained in the California Building Code and regulate the construction of new buildings and improvements. The only practical distinction between the two is that whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

AB 32, which mandates the reduction of GHG emissions in California to 1990 levels by 2020, increased the urgency around the adoption of green building standards. In its scoping plan for the implementation of AB 32, ARB identified energy use as the second largest contributor to California's GHG emissions, constituting roughly 25 percent of all such emissions. In recommending a green building strategy as one element of the scoping plan, ARB estimated that green building standards would reduce GHG emissions by approximately 26 MMT of CO_2e by 2020. The green buildings standards were most recently updated in 2016.

Senate Bill 97

Senate Bill 97 (SB 97) was enacted in 2007. SB 97 required OPR to develop, and the Natural Resources Agency to adopt, amendments to the CEQA Guidelines addressing the analysis and mitigation of GHG emissions. Those CEQA Guidelines amendments clarified several points, including the following:

- Lead agencies must analyze the GHG emissions of proposed projects and must reach a conclusion regarding the significance of those emissions.
- When a project's GHG emissions may be significant, lead agencies must consider a range of potential mitigation measures to reduce those emissions.
- Lead agencies must analyze potentially significant impacts associated with placing projects in hazardous locations, including locations potentially affected by climate change.
- Lead agencies may significantly streamline the analysis of GHGs on a project level by using a programmatic GHG emissions reduction plan meeting certain criteria.
- CEQA mandates analysis of a proposed project's potential energy use (including transportation-related energy), sources of energy supply and ways to reduce energy demand, including through the use of efficient transportation alternatives.

Short-Lived Climate Pollutant Reduction Strategy

In March 2017, the ARB adopted the *Short-Lived Climate Pollutant Reduction Strategy* (*SLCP Strategy*) establishing a path to decrease GHG emissions and displace fossil-based natural gas use. Strategies include avoiding landfill methane emissions by reducing the disposal of organics through edible food recovery, composting, in-vessel digestion, and other processes; and recovering methane from wastewater treatment facilities, and manure methane at dairies, and using the methane as a renewable source of natural gas to fuel vehicles or generate electricity. The *SLCP Strategy* also identifies steps to reduce natural gas leaks from oil and gas wells, pipelines, valves, and pumps to improve safety, avoid energy losses, and reduce methane emissions associated with natural gas use. Lastly, the *SLCP Strategy* also identifies measures that can reduce hydrofluorocarbon (HFC) emissions at national and international levels, in addition to State-level action that includes an incentive program to encourage the use of low-Global Warming Potential (GWP) refrigerants, and limitations on the use of high-GWP refrigerants in new refrigeration and air-conditioning equipment (ARB 2017).

SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

SJVAPCD Climate Change Action Plan

On August 21, 2008, the SJVAPCD Governing Board approved the SJVAPCD's *Climate Change Action Plan* with the following goals and actions:

Goals:

- Assist local land-use agencies with California Environmental Quality Act (CEQA) issues relative to projects with GHG emissions increases.
- Assist Valley businesses in complying with mandates of AB 32.
- Ensure that climate protection measures do not cause increase in toxic or criteria pollutants that adversely impact public health or environmental justice communities.

Actions:

- Authorize the Air Pollution Control Officer to develop GHG significance threshold(s) or other mechanisms to address CEQA projects with GHG emissions increases. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in the spring of 2009.
- Authorize the Air Pollution Control Officer to develop necessary regulations and instruments for establishment and administration of the San Joaquin Valley Carbon Exchange Bank for voluntary GHG reductions created in the Valley. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in spring 2009.
- Authorize the Air Pollution Control Officer to enhance the SJVAPCD's existing criteria pollutant emissions inventory reporting system to allow businesses subject to AB32 emission reporting requirements to submit simultaneous streamlined reports to the SJVAPCD and the state of California with minimal duplication.
- Authorize the Air Pollution Control Officer to develop and administer voluntary GHG emission reduction agreements to mitigate proposed GHG increases from new projects.
- Direct the Air Pollution Control Officer to support climate protection measures that reduce GHG emissions as well as toxic and criteria pollutants. Oppose measures that result in a significant increase in toxic or criteria pollutant emissions in already impacted area.

SJVAPCD CEQA Greenhouse Gas Guidance.

On December 17, 2009, the SJVAPCD Governing Board adopted "Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA" and the policy, "District Policy—Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency." The SJVAPCD concluded that the existing science is inadequate to support quantification of the impacts that project specific greenhouse gas emissions have on global climatic change. The SJVAPCD found the effects of project-specific emissions to be cumulative, and without mitigation, that their incremental contribution to global climatic change could be considered cumulatively considerable. The SJVAPCD found that this cumulative impact is best addressed by requiring all projects to reduce their greenhouse gas emissions, whether through project design elements or mitigation.

The SJVAPCD's approach is intended to streamline the process of determining if project-specific greenhouse gas emissions would have a significant effect. Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources and have a certified final CEQA document.

Best performance standards (BPS) would be established according to performance-based determinations. Projects complying with BPS would not require specific quantification of greenhouse gas emissions and would be determined to have a less than significant cumulative impact for greenhouse gas emissions. Projects not complying with BPS would require quantification of greenhouse gas emissions and demonstration that greenhouse gas emissions have been reduced or mitigated by 29 percent, as targeted by ARB's AB 32 Scoping Plan. Furthermore, quantification of greenhouse gas emissions would be required for all projects for which the lead agency has determined that an Environmental Impact Report is required, regardless of whether the project incorporates Best Performance Standards.

For stationary source permitting projects, best performance standards are "the most stringent of the identified alternatives for control of greenhouse gas emissions, including type of equipment, design of equipment and operational and maintenance practices, which are achieved-in-practice for the identified service, operation, or emissions unit class." For development projects, best performance standards are "any combination of identified greenhouse gas emission reduction measures, including project design elements and land use decisions that reduce project specific greenhouse gas emission reductions by at least 29 percent compared with business as usual." The SJVAPCD proposes to create a list of all approved Best Performance Standards to help in the determination as to whether a proposed project has reduced its GHG emissions by 29 percent.

IMPACTS & MITIGATION MEASURES

METHODOLOGY

Short-term Impacts

Short-term construction emissions associated with the proposed project were calculated using the CalEEMod computer program. Modeling includes emissions generated during site preparation/grading, asphalt paving, facility construction, and application of architectural coatings. Detailed construction information, including construction schedules and equipment requirements, has not been identified for the proposed project. Default construction phases and equipment assumptions contained in the CalEEMod model were, therefore, relied upon for the calculation of construction-generated emissions. To be conservative, construction was assumed to begin in 2018 and occur over an approximate As previously noted, an estimated date of project construction has not yet been identified. However, the District estimates that the school could be constructed within approximately five years. To be conservative, construction of the project was assumed to begin in 2018. Due to anticipated reductions in future fleet-average emission rates, emissions for post-year 2018 conditions would be less. Modeling assumptions and output files are included in Appendix A of this report.

Long-term Impacts

Long-term operational GHG emissions associated with the proposed project were calculated using the CalEEMod computer program. Modeling was conducted based on traffic data derived, in part, from the traffic analysis prepared for the proposed project (JLB 2018). Mobile-source emissions were conservatively based on the default fleet distribution assumptions contained in the model. All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model. As previously noted, an estimated date of project construction and opening have not yet been identified. However, the District estimates that the school could be constructed within approximately five years. To be conservative, initial operation of the project was assumed to begin in 2020. Due to anticipated reductions in future fleet-average mobile-source and energy emission rates, emissions for post-year 2020 operational conditions would be less. Modeling assumptions and output files are included in Appendix A of this report.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines Initial Study Checklist, a project would be considered to have a significant impact to climate change if it would:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or,

b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

San Joaquin Valley Air Pollution Control District

In accordance with the SJVAPCD's *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects Under CEQA* (SJVAPCD 2009), a project would be considered to have a less than significant impact on climate change if it would comply with at least one of the following criteria:

- Comply with an approved GHG emission reduction plan or GHG mitigation program which avoids or substantially reduces GHG emissions within the geographic area in which the project is located. Such plans or programs must be specified in law or approved by the lead agency with jurisdiction over the affected resource and supported by a CEQA compliant environmental review document adopted by the lead agency, or
- Implement approved best performance standards, or
- Quantify project GHG emissions and reduce those emissions by at least 29 percent compared to "business as usual" (BAU).

The SJVAPCD has not yet adopted best performance standards for development projects. In addition, although the City of Fresno has adopted a GHG-reduction plan for emissions generated by activities under the control or influence of the City, the City's GHG-reduction plan does not specifically address the development of schools for which the FUSD is the lead agency. The quantification of project-generated GHG emissions in comparison to BAU conditions to determine consistency with AB 32's reduction goals is considered appropriate in some instances. However, based on the California Supreme Court's decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming (2015) 224 Cal.App.4th 1105 (CBD vs. CDFW;* also known as the *"Newhall Ranch case")*, substantial evidence would need to be provided to document that project-level reductions in comparison to a BAU approach would be consistent with achieving AB 32's overall statewide reduction goal. Given that AB 32's statewide goal includes reductions that are not necessarily related to an individual development project, the use of this approach may be difficult to support given the lack of substantial evidence to adequately demonstrate a link between the data contained in the AB 32 Scoping Plan and individual development projects. Alternatively, the Court identified potential options for evaluating GHG impacts for individual development projects, which included the use of GHG efficiency metrics. In general, GHG efficiency metrics can be used to assess the GHG efficiency of an individual project based on a per capita basis or on a service population basis.

A GHG efficiency threshold based on service population can be calculated by dividing the GHG emissions inventory goal (allowable emissions), by the estimated service population of the individual project. For most development projects, service population is traditionally defined as the sum of the number of jobs and the number of residents provided by a project. However, this traditional definition of service population may not be applicable to all projects, depending on the end use. For instance, with regard to schools, the student and employee population is the primary generator of GHG emissions with a majority of the school's emissions being associated with student vehicle trips. Therefore, the calculated GHG efficiency of the proposed project was expanded to include the proposed student and employee population. GHG efficiency for the proposed project was calculated for years 2020 and 2030 to be consistent with state GHG-reduction target years. The methodology used for quantification of the target efficiency threshold applied to the proposed project is summarized in Table 8. Project-generated GHG emissions that would exceed the efficiency threshold of 4.6 $MTCO_2e$ per service population ($MTCO_2e$/SP/year) in year 2020 or 3.3

$MTCO_2e$/SP/year in 2030 would be considered to have a potentially significant impact on the environment that could conflict with GHG-reduction planning efforts. To be conservative, construction-generated GHG emissions were amortized based on an estimated 30-year project life and included in annual operational GHG emissions estimates.

Table 8
Project-Level GHG Efficiency Threshold Calculation

	2020	2030
Land Use Sectors GHG Emissions Target[1]	272,850,000	213,000,000
Population[2]	40,467,295	43,631,295
Employment[3]	18,862,840	20,795,940
Service Population	59,330,135	64,427,235
GHG Efficiency Threshold ($MTCO_2e$/SP/yr)	4.6	3.3

Based on AB 32 Scoping Plan's land use inventory sectors for years 2020 and 2030; Includes transportation sources.

1. *California Air Resources Board. 2007 (CARB). California 1990 Greenhouse Gas Emissions Level and 2020 Limit — by Sector and Activity (Land Use-driven sectors only) MMT CO2e - (based upon IPCC Fourth Assessment Report Global Warming Potentials).*
2. *California Department of Finance, Demographic Research Unit. 2019. Report P-1 "State Population Projections (2010 - 2060), Total Population by County".*
3. *California Employment Development Department. 2019. Employment Projections Labor Market Information Resources and Data, "CA Long-Term. 2016-2026 Statewide Employment Projections".*

PROJECT IMPACTS

Impact GHG-A. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? and

Implementation of the proposed project would contribute to increases of GHG emissions that are associated with global climate change. Short-term and long-term GHG emissions associated with the development of the proposed project are discussed in greater detail, as follows:

Short-term Greenhouse Gas Emissions

Short-term annual GHG emissions are summarized in Table 9. Based on the modeling conducted, annual emissions of GHGs associated with construction of the proposed project would total approximately 1,023 $MTCO_2e$. There would also be a small amount of GHG emissions from waste generated during construction; however, this amount is speculative. Actual emissions would vary, depending on various factors including construction schedules, equipment required, and activities conducted. Assuming an average project life of 30 years, amortized construction-generated GHG emissions would total approximately 34 $MTCO_2e$/yr. Amortized construction-generated GHG emissions were included in the operational GHG emissions inventory for the evaluation of project-generated GHG emissions (refer to Table 10).

Table 9
Short-Term Construction GHG Emissions

Construction Year	Total GHG Emissions ($MTCO_2e$)
Year 1	326
Year 2	697
Total:	1,023
Amortized Construction Emissions:	34

Based on CalEEMod computer modeling. Assumes a 30-year project life. Refer to Appendix A for modeling results and assumptions.

Long-term Greenhouse Gas Emissions

Estimated long-term increases in GHG emissions associated with the proposed project are summarized in Table 10. Based on the modeling conducted, operational GHG emissions would total approximately 3,106 $MTCO_2e$/year in 2020 and approximately 2,568 $MTCO_2e$/year in 2030. It is important to note, however, that these estimates include motor-vehicle emissions associated with existing operations that would be relocated with project implementation. With the removal of these existing motor-vehicle emissions and the inclusion of amortized construction emissions, overall net increases of operational GHG emissions would total approximately 910 $MTCO_2e$/year in 2020 and approximately 763 $MTCO_2e$/year in 2030. Assuming an on-site population of 1,321 students and employees, the calculated GHG efficiency for the proposed project would be 2.4 $MTCO_2e$/SP/yr in 2020 and 1.9 $MTCO_2e$/SP/yr in 2030. The GHG efficiency for the proposed project would not exceed the thresholds of 4.6 $MTCO_2e$/SP/yr in 2020 or 3.3 $MTCO_2e$/SP/yr in 2030.

Table 10
Long-term Operational GHG Emissions

Emissions Source	GHG Emissions ($MTCO_2e$ per year) [1]	
	Year 2020	Year 2030
Energy Use	558	454
Mobile Sources[2]	2.474	2,042
Waste Generation[3]	60	60
Water Use[4]	14	12
Total Project Operational Emissions:	3,106	2,568
Less Existing Mobile-Source Emissions[5]:	-2,230	-1,839
Amortized Construction Emissions:	34	34
Net Increase:	910	763
Service Population:	1,321	1,321
Project GHG Efficiency ($MTCO_2e$/SP/yr)[6]:	2.4	1.9
GHG Efficiency Threshold ($MTCO_2e$/SP/yr):	4.6	3.3
Exceeds Threshold/Significant Impact?	No	No

1. Project-generated emissions were quantified using the CalEEMod computer program.
2. Fleet distribution data for the project is not available. Mobile-source emissions are conservatively based on default vehicle fleet distribution for Fresno County, which includes all vehicle types/classificaations, including medium and heavy-duty vehicles. Actual emissions would likely be lower.
3. Based on state-wide waste diversion rate of 50 percent for 2020 and target diversion of 75% for 2030.
4. Includes installation of low-flow water fixtures and water-efficient irrigation systems, per California's 2015 water-efficiency standards.
5. Reflects vehicle trips already associated with existing operations that would be relocated with project implementation.
6. Based on total project operational emissions and a combined student and employee population of 1,321 individuals (OPR 2019).
Refer to Appendix A for modeling results and assumptions.

As depicted in Table 10, operational GHG emissions associated with the proposed project would be predominantly associated with mobile sources. It is important to note that mobile-source emissions were conservatively calculated, based on the default fleet-distribution assumptions contained in the model, which includes medium and heavy-duty vehicles. Mobile sources associated with the proposed project would consist largely to light-duty vehicles. As a result, actual mobile-source emissions would be less. Nonetheless, because the GHG efficiency for the proposed project would not exceed the efficiency thresholds of 4.6 $MTCO_2e$/SP/yr in 2020 or 3.3 $MTCO_2e$/SP/yr in 2030, this impact would be considered ***less than significant***.

Impact GHG-B.	***Would the project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?***

As noted in Impact GHG-A, the proposed project would not result in increased GHG emissions that would conflict with AB 32 GHG-reduction targets. The proposed project would be designed to meet current building energy-efficiency standards, which includes measures to reduce overall energy use, water use, and waste generation. The project would also be designed to promote the use of alternative means of transportation, such as bicycle use, and to provide improved pedestrian access that would link the project site to nearby land uses. These improvements would help to further reduce the project's GHG emissions and would also help to reduce community-wide GHG emissions. For these reasons, the proposed project would not conflict with local or state GHG-reduction planning efforts. This impact would be considered ***less than significant***.

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APPENDIX A

EMISSIONS MODELING & DOCUMENTATION

EMISSIONS SUMMARY - ANNUAL CONSTRUCTION

UNMITIGATED EMISSIONS (TONS)											
					PM10			PM2.5			
CONSTRUCTION YR 1	**ROG**	**NOX**	**CO**	**SOX**	**FUG**	**EXH**	**TOT**	**FUG**	**EXH**	**TOT**	**CO2E**
DEMOLITION											
ONSITE	0.04	0.36	0.22	0.00	0.02	0.02	0.04	0.00	0.02	0.02	34.87
OFFSITE	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.68
TOTAL	0.04	0.39	0.23	0.00	0.02	0.02	0.04	0.00	0.02	0.02	43.55
SITE PREPARATION											
ONSITE	0.02	0.23	0.11	0.00	0.09	0.01	0.10	0.05	0.01	0.06	17.22
OFFSITE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64
TOTAL	0.02	0.23	0.11	0.00	0.09	0.01	0.10	0.05	0.01	0.06	17.86
GRADING											
ONSITE	0.07	0.82	0.50	0.00	0.13	0.04	0.17	0.05	0.03	0.09	84.21
OFFSITE	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.14
TOTAL	0.07	0.82	0.51	0.00	0.13	0.04	0.17	0.05	0.03	0.09	86.36
BUILDING CONSTRUCTION											
ONSITE	0.07	0.60	0.49	0.00	0.00	0.04	0.04	0.00	0.03	0.03	67.41
OFFSITE	0.04	0.35	0.25	0.00	0.07	0.00	0.07	0.02	0.00	0.02	110.71
TOTAL	0.11	0.95	0.74	0.00	0.07	0.04	0.11	0.02	0.04	0.06	178.12
					PM10			PM2.5			
CONSTRUCTION YR 2	**ROG**	**NOX**	**CO**	**SOX**	**FUG**	**EXH**	**TOT**	**FUG**	**EXH**	**TOT**	**CO2E**
BUILDING CONSTRUCTION											
ONSITE	0.23	2.09	1.84	0.00	0.00	0.12	0.12	0.00	0.11	0.11	253.99
OFFSITE	0.14	1.21	0.85	0.00	0.25	0.01	0.26	0.07	0.01	0.08	415.92
TOTAL	0.37	3.30	2.68	0.01	0.25	0.13	0.38	0.07	0.12	0.19	669.91
PAVING											
ONSITE	0.01	0.14	0.15	0.00	0.00	0.01	0.01	0.00	0.01	0.01	20.19
OFFSITE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04
TOTAL	0.01	0.14	0.15	0.00	0.00	0.01	0.01	0.00	0.01	0.01	21.23
ARCH COATING											
ONSITE	0.37	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.56
OFFSITE	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.05
TOTAL	0.37	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.60
TOTAL ANNUAL EMISSIONS											
CONST YR 1	**0.24**	**2.38**	**1.59**	**0.00**	**0.31**	**0.11**	**0.42**	**0.13**	**0.10**	**0.22**	**325.89**
CONST YR 2	**0.75**	**3.46**	**2.86**	**0.01**	**0.26**	**0.14**	**0.39**	**0.07**	**0.13**	**0.20**	**696.75**
TOTAL ALL CONST YRS	**0.99**	**5.85**	**4.46**	**0.01**	**0.57**	**0.24**	**0.81**	**0.20**	**0.23**	**0.42**	**1022.64**

EMISSIONS SUMMARY - AVERAGE DAILY CONSTRUCTION

UNMITIGATED ONSITE EMISSIONS (LBS)

CONSTRUCTION YR 1		CONST DAYS	ROG	NOX	CO	SOX	PM10 FUG	PM10 EXH	PM10 TOT	PM2.5 FUG	PM2.5 EXH	PM2.5 TOT
DEMOLITION		20										
	ONSITE		3.51	35.78	22.06	0.04	2.14	1.80	3.93	0.32	1.67	1.99
	OFFSITE											
	TOTAL											
SITE PREPARATION		10										
	ONSITE		1.45	15.19	7.35	0.01	6.02	0.80	6.82	3.31	0.73	4.05
	OFFSITE											
	TOTAL											
GRADING		30										
	ONSITE		4.74	54.52	33.38	0.06	8.67	2.38	11.05	3.60	2.19	5.79
	OFFSITE											
	TOTAL											
BUILDING CONSTRUCTION		40										
	ONSITE		3.37	30.04	24.46	0.04	0.00	1.84	1.84	0.00	1.73	1.73
	OFFSITE											
	TOTAL											

CONSTRUCTION YR 2		CONST DAYS	ROG	NOX	CO	SOX	PM10 FUG	PM10 EXH	PM10 TOT	PM2.5 FUG	PM2.5 EXH	PM2.5 TOT
BUILDING CONSTRUCTION		235										
	ONSITE		1.97	17.80	15.63	0.02	0.00	1.04	1.04	0.00	0.97	0.97
	OFFSITE											
	TOTAL											
PAVING		20										
	ONSITE		1.36	14.07	14.65	0.02	0.00	0.75	0.75	0.00	0.69	0.69
	OFFSITE											
	TOTAL											
ARCH COATING		20										
	ONSITE		36.74	1.68	1.83	0.00	0.00	0.11	0.11	0.00	0.11	0.11
	OFFSITE											
	TOTAL											
	TOTAL BLDG CONST, PAVING, COATING		40.07	33.55	32.11	0.05	0.00	1.90	1.90	0.00	1.77	1.77
	MAX. ON-SITE EMISSIONS		**40.07**	**35.78**	**32.11**	**0.05**	**0.00**	**1.90**	**11.05**	**0.00**	**2.19**	**5.79**

EMISSIONS SUMMARY - ANNUAL & AVG. DAILY ON-SITE OPERATIONAL

ON-SITE EMISSIONS (TONS/YR)

					PM10			PM2.5		
	ROG	**NOX**	**CO**	**SOX**	**FUG**	**EXH**	**TOT**	**FUG**	**EXH**	**TOT**
ARCH COATINGS	0.0928									
CONSUMER PRODUCTS	0.5003									
LANDSCAPE MAINTENANCE	0.00195	0.00019	0.0207	0.00E+00	0	0.00007	0.00007	0	0.00007	0.00007
NATURAL GAS USE	0.147	0.1334	0.112	0.0008	0	0.0101	0.0101	0	0.0101	0.0101
TOTAL ANNUAL EMISSIONS	0.74205	0.13359	0.1327	0.0008	0	0.01017	0.01017	0	0.01017	0.01017
OPERATIONAL DAYS	240									
AVG. DAILY EMISSIONS	**6.18375**	**1.11325**	**1.10583333**	**0.00666667**	**0**	**0.08475**	**0.08475**	**0**	**0.08475**	**0.08475**

Fresno City College Parking & Facilities Expansion Project

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Junior College (2Yr)	980.00	Student	0.98	42,779.19	0
Day-Care Center	77.00	Student	0.10	4,352.26	0
Office Park	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	488.3	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

Project Characteristics - For quantification of existing operational mobile-source emissions only. Construction and area/stationary source emissions do not

Land Use - College: 980 students; Daycare: 77 students; Maintenance Op: 30 employees; school office: 70 employees; gov office: 23 employees (603 employee trips total).

Construction Phase - Const does not apply

Vehicle Trips - Based on trip-gen derived from the traffic analysis.

Vehicle Emission Factors - Default fleet mix.

Vehicle Emission Factors -

Vehicle Emission Factors -

Energy Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	488.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblVehicleTrips	ST_TR	0.39	0.00
tblVehicleTrips	ST_TR	0.42	0.00
tblVehicleTrips	ST_TR	1.64	0.00
tblVehicleTrips	SU_TR	0.37	0.00
tblVehicleTrips	SU_TR	0.04	0.00
tblVehicleTrips	SU_TR	0.76	0.00
tblVehicleTrips	WD_TR	4.38	4.09
tblVehicleTrips	WD_TR	1.23	1.15
tblVehicleTrips	WD_TR	11.42	603.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0236	0.2272	0.1530	2.5000e-004	1.0400e-003	0.0129	0.0139	2.8000e-004	0.0120	0.0123						22.4815
Maximum	**0.0236**	**0.2272**	**0.1530**	**2.5000e-004**	**1.0400e-003**	**0.0129**	**0.0139**	**2.8000e-004**	**0.0120**	**0.0123**						**22.4815**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0236	0.2272	0.1530	2.5000e-004	1.0400e-003	0.0129	0.0139	2.8000e-004	0.0120	0.0123						22.4815
Maximum	**0.0236**	**0.2272**	**0.1530**	**2.5000e-004**	**1.0400e-003**	**0.0129**	**0.0139**	**2.8000e-004**	**0.0120**	**0.0123**						**22.4815**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**7-21-2019**	**9-30-2019**	0.2418	0.2418
		Highest	0.2418	0.2418

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2224	9.0000e-005	9.7800e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005						0.0202
Energy	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						175.8642
Mobile	0.5612	6.5762	5.1257	0.0239	1.2991	0.0278	1.3269	0.3503	0.0264	0.3766						2,230.0073
Waste						0.0000	0.0000		0.0000	0.0000						97.4774
Water						0.0000	0.0000		0.0000	0.0000						9.3292
Total	**0.7893**	**6.6291**	**5.1798**	**0.0242**	**1.2991**	**0.0319**	**1.3310**	**0.3503**	**0.0304**	**0.3807**						**2,512.6982**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2224	9.0000e-005	9.7800e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005						0.0202
Energy	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						175.8642
Mobile	0.5612	6.5762	5.1257	0.0239	1.2991	0.0278	1.3269	0.3503	0.0264	0.3766						2,230.0073
Waste						0.0000	0.0000		0.0000	0.0000						97.4774
Water						0.0000	0.0000		0.0000	0.0000						9.3292
Total	**0.7893**	**6.6291**	**5.1798**	**0.0242**	**1.2991**	**0.0319**	**1.3310**	**0.3503**	**0.0304**	**0.3807**						**2,512.6982**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/21/2019	8/16/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0230	0.2268	0.1489	2.4000e-004		0.0129	0.0129		0.0120	0.0120						21.5524
Total	**0.0230**	**0.2268**	**0.1489**	**2.4000e-004**		**0.0129**	**0.0129**		**0.0120**	**0.0120**						**21.5524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	4.0000e-004	4.0500e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004						0.9291
Total	**6.1000e-004**	**4.0000e-004**	**4.0500e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0500e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**						**0.9291**

3.2 Demolition - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0230	0.2268	0.1489	2.4000e-004		0.0129	0.0129		0.0120	0.0120						21.5524
Total	**0.0230**	**0.2268**	**0.1489**	**2.4000e-004**		**0.0129**	**0.0129**		**0.0120**	**0.0120**						**21.5524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	4.0000e-004	4.0500e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004						0.9291
Total	**6.1000e-004**	**4.0000e-004**	**4.0500e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0500e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**						**0.9291**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5612	6.5762	5.1257	0.0239	1.2991	0.0278	1.3269	0.3503	0.0264	0.3766						2,230.0073
Unmitigated	0.5612	6.5762	5.1257	0.0239	1.2991	0.0278	1.3269	0.3503	0.0264	0.3766						2,230.0073

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Day-Care Center	314.93	0.00	0.00	264,908	264,908
Junior College (2Yr)	1,127.00	0.00	0.00	2,044,327	2,044,327
Office Park	603.00	0.00	0.00	1,079,477	1,079,477
Total	2,044.93	0.00	0.00	3,388,712	3,388,712

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Day-Care Center	9.50	7.30	7.30	12.70	82.30	5.00	28	58	14
Junior College (2Yr)	9.50	7.30	7.30	6.40	88.60	5.00	92	7	1
Office Park	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Day-Care Center	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667
Junior College (2Yr)	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667
Office Park	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						118.0468
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						118.0468
NaturalGas Mitigated	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						57.8174
NaturalGas Unmitigated	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						57.8174

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	109285	5.9000e-004	5.3600e-003	4.5000e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004						5.8665
Junior College (2Yr)	944992	5.1000e-003	0.0463	0.0389	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003						50.7281
Office Park	22780	1.2000e-004	1.1200e-003	9.4000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005						1.2229
Total		**5.8100e-003**	**0.0528**	**0.0444**	**3.2000e-004**		**4.0100e-003**	**4.0100e-003**		**4.0100e-003**	**4.0100e-003**						**57.8174**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	109285	5.9000e-004	5.3600e-003	4.5000e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004						5.8665
Junior College (2Yr)	944992	5.1000e-003	0.0463	0.0389	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003						50.7281
Office Park	22780	1.2000e-004	1.1200e-003	9.4000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005						1.2229
Total		**5.8100e-003**	**0.0528**	**0.0444**	**3.2000e-004**		**4.0100e-003**	**4.0100e-003**		**4.0100e-003**	**4.0100e-003**						**57.8174**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	30552.9				6.7954
Junior College (2Yr)	488538				108.6580
Office Park	11660				2.5934
Total					**118.0468**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	30552.9				6.7954
Junior College (2Yr)	488538				108.6580
Office Park	11660				2.5934
Total					**118.0468**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2224	9.0000e-005	9.7800e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005						0.0202
Unmitigated	0.2224	9.0000e-005	9.7800e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005						0.0202

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0335					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.1880					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	9.2000e-004	9.0000e-005	9.7800e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005						0.0202
Total	**0.2224**	**9.0000e-005**	**9.7800e-003**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**						**0.0202**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0335					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.1880					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	9.2000e-004	9.0000e-005	9.7800e-003	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005						0.0202
Total	**0.2224**	**9.0000e-005**	**9.7800e-003**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**						**0.0202**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				9.3292
Unmitigated				9.3292

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.186666 / 0.48				0.8524
Junior College (2Yr)	2.09828 / 3.28192				7.9362
Office Park	0.177734 / 0.108934				0.5406
Total					**9.3292**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.186666 / 0.48				0.8524
Junior College (2Yr)	2.09828 / 3.28192				7.9362
Office Park	0.177734 / 0.108934				0.5406
Total					**9.3292**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				97.4774
Unmitigated				97.4774

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	14.05				7.0658
Junior College (2Yr)	178.85				89.9439
Office Park	0.93				0.4677
Total					**97.4774**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	14.05				7.0658
Junior College (2Yr)	178.85				89.9439
Office Park	0.93				0.4677
Total					**97.4774**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Fresno City College Expansion Project

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Junior College (2Yr)	1,110.00	Student	2.50	95,000.00	0
Day-Care Center	119.00	Student	0.75	16,480.00	0
General Light Industry	10.00	1000sqft	0.23	10,000.00	0
General Office Building	1.00	1000sqft	0.02	0.00	0
Unenclosed Parking with Elevator	1,000.00	Space	9.00	400,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	488.3	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Includes RPS adjustment

Land Use - Land uses and trip gen from traffic analysis

Construction Phase - Based on model defaults.

Demolition - 43400 sf total demo

Architectural Coating - Includes use of low-VOC (50 g/L or less) paints.

Vehicle Trips - Based on trip gen from traffic analysis

Energy Use -

Construction Off-road Equipment Mitigation - Includes 50%CE for watering roads, 61%CE for watering exposed surfaces, 15mph speed limit. T3 for informational purposes.

Energy Mitigation - Includes installation of high-eff. lighting

Water Mitigation - Includes use of low-flow fixtures and water-eff. irrigation systems

Waste Mitigation - Assumes 50% diversion based on current statewide averages

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	150.00	50.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	300.00	275.00
tblConstructionPhase	PhaseEndDate	1/29/2021	12/25/2020
tblConstructionPhase	PhaseEndDate	12/4/2020	10/30/2020
tblConstructionPhase	PhaseEndDate	1/1/2021	11/27/2020
tblConstructionPhase	PhaseStartDate	1/2/2021	11/28/2020
tblConstructionPhase	PhaseStartDate	12/5/2020	11/1/2020
tblLandUse	LandUseSquareFeet	48,453.98	95,000.00
tblLandUse	LandUseSquareFeet	6,726.22	16,480.00

tblLandUse	LandUseSquareFeet	1,000.00	0.00
tblLandUse	LotAcreage	1.11	2.50
tblLandUse	LotAcreage	0.15	0.75
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	488.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblVehicleTrips	ST_TR	0.39	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	SU_TR	0.37	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	WD_TR	4.38	4.09
tblVehicleTrips	WD_TR	6.97	5.50
tblVehicleTrips	WD_TR	11.03	410.00
tblVehicleTrips	WD_TR	1.23	1.15

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2392	2.3825	1.5918	3.5800e-003	0.3138	0.1053	0.4190	0.1264	0.0979	0.2242						325.8911
2020	0.7522	3.4638	2.8645	7.6900e-003	0.2570	0.1377	0.3947	0.0697	0.1295	0.1992						696.7474
Maximum	**0.7522**	**3.4638**	**2.8645**	**7.6900e-003**	**0.3138**	**0.1377**	**0.4190**	**0.1264**	**0.1295**	**0.2242**						**696.7474**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.1000	1.5119	1.6929	3.5800e-003	0.1663	0.0615	0.2277	0.0612	0.0613	0.1225						325.8908
2020	0.5848	2.8922	3.0027	7.6900e-003	0.2570	0.1129	0.3698	0.0697	0.1125	0.1822						696.7471
Maximum	**0.5848**	**2.8922**	**3.0027**	**7.6900e-003**	**0.2570**	**0.1129**	**0.3698**	**0.0697**	**0.1125**	**0.1822**						**696.7471**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**30.93**	**24.67**	**-5.37**	**0.00**	**25.85**	**28.26**	**26.57**	**33.24**	**23.54**	**28.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-21-2019	10-20-2019	1.6699	0.8831
2	10-21-2019	1-20-2020	1.1968	0.9314
3	1-21-2020	4-20-2020	1.0973	0.8891
4	4-21-2020	7-20-2020	1.0933	0.8852
5	7-21-2020	9-30-2020	0.8651	0.7003
		Highest	1.6699	0.9314

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.5951	1.9000e-004	0.0207	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0427
Energy	0.0147	0.1334	0.1120	8.0000e-004		0.0101	0.0101		0.0101	0.0101						605.3083
Mobile	0.6326	7.3961	5.7075	0.0265	1.4311	0.0308	1.4619	0.3859	0.0292	0.4150						2,473.7298
Waste						0.0000	0.0000		0.0000	0.0000						119.4995
Water						0.0000	0.0000		0.0000	0.0000						16.7776
Total	**1.2423**	**7.5296**	**5.8402**	**0.0273**	**1.4311**	**0.0410**	**1.4721**	**0.3859**	**0.0394**	**0.4252**						**3,215.3578**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.5951	1.9000e-004	0.0207	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0427
Energy	0.0147	0.1334	0.1120	8.0000e-004		0.0101	0.0101		0.0101	0.0101						558.0078
Mobile	0.6326	7.3961	5.7075	0.0265	1.4311	0.0308	1.4619	0.3859	0.0292	0.4150						2,473.7298
Waste						0.0000	0.0000		0.0000	0.0000						59.7497
Water						0.0000	0.0000		0.0000	0.0000						13.9164
Total	**1.2423**	**7.5296**	**5.8402**	**0.0273**	**1.4311**	**0.0410**	**1.4721**	**0.3859**	**0.0394**	**0.4252**						**3,105.4464**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.42**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/21/2019	8/16/2019	5	20	
2	Site Preparation	Site Preparation	8/17/2019	8/30/2019	5	10	
3	Grading	Grading	8/31/2019	10/11/2019	5	30	
4	Building Construction	Building Construction	10/12/2019	10/30/2020	5	275	
5	Paving	Paving	11/1/2020	11/27/2020	5	20	
6	Architectural Coating	Architectural Coating	11/28/2020	12/25/2020	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 9

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 182,220; Non-Residential Outdoor: 60,740; Striped Parking Area: 24,000 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	197.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	219.00	85.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	44.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0214	0.0000	0.0214	3.2300e-003	0.0000	3.2300e-003						0.0000
Off-Road	0.0351	0.3578	0.2206	3.9000e-004		0.0180	0.0180		0.0167	0.0167						34.8672
Total	**0.0351**	**0.3578**	**0.2206**	**3.9000e-004**	**0.0214**	**0.0180**	**0.0393**	**3.2300e-003**	**0.0167**	**0.0199**						**34.8672**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.5000e-004	0.0297	3.9600e-003	8.0000e-005	1.6800e-003	1.2000e-004	1.8000e-003	4.6000e-004	1.1000e-004	5.7000e-004						7.6073
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	7.1000e-004	4.7000e-004	4.6700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004						1.0720
Total	**1.5600e-003**	**0.0302**	**8.6300e-003**	**9.0000e-005**	**2.8800e-003**	**1.3000e-004**	**3.0100e-003**	**7.8000e-004**	**1.2000e-004**	**9.0000e-004**						**8.6793**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.3300e-003	0.0000	8.3300e-003	1.2600e-003	0.0000	1.2600e-003						0.0000
Off-Road	9.2500e-003	0.1831	0.2467	3.9000e-004		8.6300e-003	8.6300e-003		8.6300e-003	8.6300e-003						34.8671
Total	**9.2500e-003**	**0.1831**	**0.2467**	**3.9000e-004**	**8.3300e-003**	**8.6300e-003**	**0.0170**	**1.2600e-003**	**8.6300e-003**	**9.8900e-003**						**34.8671**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.5000e-004	0.0297	3.9600e-003	8.0000e-005	1.6800e-003	1.2000e-004	1.8000e-003	4.6000e-004	1.1000e-004	5.7000e-004						7.6073
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	7.1000e-004	4.7000e-004	4.6700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004						1.0720
Total	**1.5600e-003**	**0.0302**	**8.6300e-003**	**9.0000e-005**	**2.8800e-003**	**1.3000e-004**	**3.0100e-003**	**7.8000e-004**	**1.2000e-004**	**9.0000e-004**						**8.6793**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497						0.0000
Off-Road	0.0217	0.2279	0.1103	1.9000e-004		0.0120	0.0120		0.0110	0.0110						17.2195
Total	**0.0217**	**0.2279**	**0.1103**	**1.9000e-004**	**0.0903**	**0.0120**	**0.1023**	**0.0497**	**0.0110**	**0.0607**						**17.2195**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	4.3000e-004	2.8000e-004	2.8000e-003	1.0000e-005	7.2000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	2.0000e-004						0.6432
Total	**4.3000e-004**	**2.8000e-004**	**2.8000e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**						**0.6432**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0352	0.0000	0.0352	0.0194	0.0000	0.0194						0.0000
Off-Road	4.6600e-003	0.0953	0.1148	1.9000e-004		4.7300e-003	4.7300e-003		4.7300e-003	4.7300e-003						17.2195
Total	**4.6600e-003**	**0.0953**	**0.1148**	**1.9000e-004**	**0.0352**	**4.7300e-003**	**0.0400**	**0.0194**	**4.7300e-003**	**0.0241**						**17.2195**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	4.3000e-004	2.8000e-004	2.8000e-003	1.0000e-005	7.2000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	2.0000e-004						0.6432
Total	**4.3000e-004**	**2.8000e-004**	**2.8000e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**						**0.6432**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540						0.0000
Off-Road	0.0711	0.8178	0.5007	9.3000e-004		0.0357	0.0357		0.0329	0.0329						84.2129
Total	**0.0711**	**0.8178**	**0.5007**	**9.3000e-004**	**0.1301**	**0.0357**	**0.1658**	**0.0540**	**0.0329**	**0.0868**						**84.2129**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.4200e-003	9.3000e-004	9.3500e-003	2.0000e-005	2.4000e-003	2.0000e-005	2.4100e-003	6.4000e-004	1.0000e-005	6.5000e-004						2.1440
Total	**1.4200e-003**	**9.3000e-004**	**9.3500e-003**	**2.0000e-005**	**2.4000e-003**	**2.0000e-005**	**2.4100e-003**	**6.4000e-004**	**1.0000e-005**	**6.5000e-004**						**2.1440**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0507	0.0000	0.0507	0.0210	0.0000	0.0210						0.0000
Off-Road	0.0229	0.4497	0.5508	9.3000e-004		0.0195	0.0195		0.0195	0.0195						84.2128
Total	**0.0229**	**0.4497**	**0.5508**	**9.3000e-004**	**0.0507**	**0.0195**	**0.0702**	**0.0210**	**0.0195**	**0.0405**						**84.2128**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.4200e-003	9.3000e-004	9.3500e-003	2.0000e-005	2.4000e-003	2.0000e-005	2.4100e-003	6.4000e-004	1.0000e-005	6.5000e-004						2.1440
Total	**1.4200e-003**	**9.3000e-004**	**9.3500e-003**	**2.0000e-005**	**2.4000e-003**	**2.0000e-005**	**2.4100e-003**	**6.4000e-004**	**1.0000e-005**	**6.5000e-004**						**2.1440**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0673	0.6008	0.4892	7.7000e-004		0.0368	0.0368		0.0346	0.0346						67.4128
Total	**0.0673**	**0.6008**	**0.4892**	**7.7000e-004**		**0.0368**	**0.0368**		**0.0346**	**0.0346**						**67.4128**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0112	0.3275	0.0558	6.9000e-004	0.0161	2.3800e-003	0.0184	4.6400e-003	2.2700e-003	6.9100e-003						66.1067
Worker	0.0295	0.0194	0.1945	4.9000e-004	0.0499	3.3000e-004	0.0502	0.0133	3.0000e-004	0.0136						44.6057
Total	**0.0406**	**0.3469**	**0.2503**	**1.1800e-003**	**0.0660**	**2.7100e-003**	**0.0687**	**0.0179**	**2.5700e-003**	**0.0205**						**110.7124**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0192	0.4054	0.5094	7.7000e-004		0.0258	0.0258		0.0258	0.0258						67.4127
Total	**0.0192**	**0.4054**	**0.5094**	**7.7000e-004**		**0.0258**	**0.0258**		**0.0258**	**0.0258**						**67.4127**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0112	0.3275	0.0558	6.9000e-004	0.0161	2.3800e-003	0.0184	4.6400e-003	2.2700e-003	6.9100e-003						66.1067
Worker	0.0295	0.0194	0.1945	4.9000e-004	0.0499	3.3000e-004	0.0502	0.0133	3.0000e-004	0.0136						44.6057
Total	**0.0406**	**0.3469**	**0.2503**	**1.1800e-003**	**0.0660**	**2.7100e-003**	**0.0687**	**0.0179**	**2.5700e-003**	**0.0205**						**110.7124**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2311	2.0913	1.8365	2.9300e-003		0.1218	0.1218		0.1145	0.1145						253.9946
Total	**0.2311**	**2.0913**	**1.8365**	**2.9300e-003**		**0.1218**	**0.1218**		**0.1145**	**0.1145**						**253.9946**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0346	1.1480	0.1833	2.6300e-003	0.0614	6.0900e-003	0.0675	0.0177	5.8300e-003	0.0236						250.6359
Worker	0.1030	0.0654	0.6635	1.8300e-003	0.1908	1.2300e-003	0.1921	0.0507	1.1300e-003	0.0519						165.2833
Total	**0.1377**	**1.2134**	**0.8468**	**4.4600e-003**	**0.2522**	**7.3200e-003**	**0.2596**	**0.0685**	**6.9600e-003**	**0.0754**						**415.9192**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0735	1.5506	1.9482	2.9300e-003		0.0985	0.0985		0.0985	0.0985						253.9943
Total	**0.0735**	**1.5506**	**1.9482**	**2.9300e-003**		**0.0985**	**0.0985**		**0.0985**	**0.0985**						**253.9943**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0346	1.1480	0.1833	2.6300e-003	0.0614	6.0900e-003	0.0675	0.0177	5.8300e-003	0.0236						250.6359
Worker	0.1030	0.0654	0.6635	1.8300e-003	0.1908	1.2300e-003	0.1921	0.0507	1.1300e-003	0.0519						165.2833
Total	**0.1377**	**1.2134**	**0.8468**	**4.4600e-003**	**0.2522**	**7.3200e-003**	**0.2596**	**0.0685**	**6.9600e-003**	**0.0754**						**415.9192**

3.6 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0136	0.1407	0.1465	2.3000e-004		7.5300e-003	7.5300e-003		6.9300e-003	6.9300e-003						20.1902
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0136**	**0.1407**	**0.1465**	**2.3000e-004**		**7.5300e-003**	**7.5300e-003**		**6.9300e-003**	**6.9300e-003**						**20.1902**

3.6 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.5000e-004	4.1000e-004	4.1700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004						1.0386
Total	**6.5000e-004**	**4.1000e-004**	**4.1700e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**						**1.0386**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6100e-003	0.1130	0.1730	2.3000e-004		6.0900e-003	6.0900e-003		6.0900e-003	6.0900e-003						20.1901
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**5.6100e-003**	**0.1130**	**0.1730**	**2.3000e-004**		**6.0900e-003**	**6.0900e-003**		**6.0900e-003**	**6.0900e-003**						**20.1901**

3.6 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.5000e-004	4.1000e-004	4.1700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004						1.0386
Total	**6.5000e-004**	**4.1000e-004**	**4.1700e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**						**1.0386**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3650					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	2.4200e-003	0.0168	0.0183	3.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003						2.5582
Total	**0.3674**	**0.0168**	**0.0183**	**3.0000e-005**		**1.1100e-003**	**1.1100e-003**		**1.1100e-003**	**1.1100e-003**						**2.5582**

3.7 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.9000e-003	1.2000e-003	0.0122	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.6000e-004						3.0466
Total	**1.9000e-003**	**1.2000e-003**	**0.0122**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.3000e-004**	**2.0000e-005**	**9.6000e-004**						**3.0466**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3650					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	5.9000e-004	0.0136	0.0183	3.0000e-005		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004						2.5582
Total	**0.3656**	**0.0136**	**0.0183**	**3.0000e-005**		**9.5000e-004**	**9.5000e-004**		**9.5000e-004**	**9.5000e-004**						**2.5582**

3.7 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.9000e-003	1.2000e-003	0.0122	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.6000e-004						3.0466
Total	**1.9000e-003**	**1.2000e-003**	**0.0122**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.3000e-004**	**2.0000e-005**	**9.6000e-004**						**3.0466**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.6326	7.3961	5.7075	0.0265	1.4311	0.0308	1.4619	0.3859	0.0292	0.4150						2,473.729 8
Unmitigated	0.6326	7.3961	5.7075	0.0265	1.4311	0.0308	1.4619	0.3859	0.0292	0.4150						2,473.729 8

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Day-Care Center	486.71	0.00	0.00	409,403	409,403
General Light Industry	55.00	13.20	6.80	123,037	123,037
General Office Building	410.00	0.00	0.00	699,856	699,856
Junior College (2Yr)	1,276.50	466.20	44.40	2,500,755	2,500,755
Unenclosed Parking with Elevator	0.00	0.00	0.00		
Total	2,228.21	479.40	51.20	3,733,050	3,733,050

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Day-Care Center	9.50	7.30	7.30	12.70	82.30	5.00	28	58	14
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Junior College (2Yr)	9.50	7.30	7.30	6.40	88.60	5.00	92	7	1
Unenclosed Parking with El...	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Day-Care Center	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667
General Light Industry	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667
General Office Building	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667
Junior College (2Yr)	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667
Unenclosed Parking with Elevator	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						411.9387
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						459.2391
NaturalGas Mitigated	0.0147	0.1334	0.1120	8.0000e-004		0.0101	0.0101		0.0101	0.0101						146.0692
NaturalGas Unmitigated	0.0147	0.1334	0.1120	8.0000e-004		0.0101	0.0101		0.0101	0.0101						146.0692

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	413813	2.2300e-003	0.0203	0.0170	1.2000e-004		1.5400e-003	1.5400e-003		1.5400e-003	1.5400e-003						22.2139
General Light Industry	208700	1.1300e-003	0.0102	8.5900e-003	6.0000e-005		7.8000e-004	7.8000e-004		7.8000e-004	7.8000e-004						11.2032
General Office Building	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Junior College (2Yr)	2.09855e+006	0.0113	0.1029	0.0864	6.2000e-004		7.8200e-003	7.8200e-003		7.8200e-003	7.8200e-003						112.6521
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0147**	**0.1334**	**0.1120**	**8.0000e-004**		**0.0101**	**0.0101**		**0.0101**	**0.0101**						**146.0692**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	413813	2.2300e-003	0.0203	0.0170	1.2000e-004		1.5400e-003	1.5400e-003		1.5400e-003	1.5400e-003						22.2139
General Light Industry	208700	1.1300e-003	0.0102	8.5900e-003	6.0000e-005		7.8000e-004	7.8000e-004		7.8000e-004	7.8000e-004						11.2032
General Office Building	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Junior College (2Yr)	2.09855e+006	0.0113	0.1029	0.0864	6.2000e-004		7.8200e-003	7.8200e-003		7.8200e-003	7.8200e-003						112.6521
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0147**	**0.1334**	**0.1120**	**8.0000e-004**		**0.0101**	**0.0101**		**0.0101**	**0.0101**						**146.0692**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	115690				25.7310
General Light Industry	88200				19.6170
General Office Building	0				0.0000
Junior College (2Yr)	1.0849e +006				241.2975
Unenclosed Parking with Elevator	776000				172.5936
Total					**459.2391**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	107806				23.9775
General Light Industry	83880				18.6561
General Office Building	0				0.0000
Junior College (2Yr)	996436				221.6218
Unenclosed Parking with Elevator	664000				147.6832
Total					**411.9387**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5951	1.9000e-004	0.0207	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0427
Unmitigated	0.5951	1.9000e-004	0.0207	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0427

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0928					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.5003					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	1.9500e-003	1.9000e-004	0.0207	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0427
Total	**0.5951**	**1.9000e-004**	**0.0207**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**						**0.0427**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0928					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.5003					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	1.9500e-003	1.9000e-004	0.0207	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0427
Total	**0.5951**	**1.9000e-004**	**0.0207**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**						**0.0427**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				13.9164
Unmitigated				16.7776

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.288485 / 0.741817				1.3173
General Light Industry	2.3125 / 0				5.9307
General Office Building	0.177734 / 0.108934				0.5406
Junior College (2Yr)	2.37662 / 3.71728				8.9889
Unenclosed Parking with Elevator	0 / 0				0.0000
Total					**16.7776**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.230788 / 0.696567				1.1341
General Light Industry	1.85 / 0				4.7446
General Office Building	0.142187 / 0.102289				0.4443
Junior College (2Yr)	1.9013 / 3.49052				7.5934
Unenclosed Parking with Elevator	0 / 0				0.0000
Total					**13.9164**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				59.7497
Unmitigated				119.4995

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	21.72				10.9230
General Light Industry	12.4				6.2360
General Office Building	0.93				0.4677
Junior College (2Yr)	202.57				101.8728
Unenclosed Parking with Elevator	0				0.0000
Total					**119.4995**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	10.86				5.4615
General Light Industry	6.2				3.1180
General Office Building	0.465				0.2339
Junior College (2Yr)	101.285				50.9364
Unenclosed Parking with Elevator	0				0.0000
Total					**59.7497**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Fresno City College Parking & Facilities Expansion Project

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Junior College (2Yr)	980.00	Student	0.98	42,779.19	0
Day-Care Center	77.00	Student	0.10	4,352.26	0
Office Park	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 45

Climate Zone 3 **Operational Year** 2021

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 488.3 **CH4 Intensity (lb/MWhr)** 0.022 **N2O Intensity (lb/MWhr)** 0.005

1.3 User Entered Comments & Non-Default Data

Project Characteristics - For quantification of existing operational mobile-source emissions only. Construction and area/stationary source emissions do not

Land Use - College: 980 students; Daycare: 77 students; Maintenance Op: 30 employees; school office: 70 employees; gov office: 23 employees (603 employee trips total).

Construction Phase - Const does not apply

Vehicle Trips - Based on trip-gen derived from the traffic analysis.

Vehicle Emission Factors - Default fleet mix.

Vehicle Emission Factors -

Vehicle Emission Factors -

Energy Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	488.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblVehicleTrips	ST_TR	0.39	0.00
tblVehicleTrips	ST_TR	0.42	0.00
tblVehicleTrips	ST_TR	1.64	0.00
tblVehicleTrips	SU_TR	0.37	0.00
tblVehicleTrips	SU_TR	0.04	0.00
tblVehicleTrips	SU_TR	0.76	0.00
tblVehicleTrips	WD_TR	4.38	4.09
tblVehicleTrips	WD_TR	1.23	1.15
tblVehicleTrips	WD_TR	11.42	603.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0236	0.2272	0.1530	2.5000e-004	1.0400e-003	0.0129	0.0139	2.8000e-004	0.0120	0.0123						22.4815
Maximum	**0.0236**	**0.2272**	**0.1530**	**2.5000e-004**	**1.0400e-003**	**0.0129**	**0.0139**	**2.8000e-004**	**0.0120**	**0.0123**						**22.4815**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0236	0.2272	0.1530	2.5000e-004	1.0400e-003	0.0129	0.0139	2.8000e-004	0.0120	0.0123						22.4815
Maximum	**0.0236**	**0.2272**	**0.1530**	**2.5000e-004**	**1.0400e-003**	**0.0129**	**0.0139**	**2.8000e-004**	**0.0120**	**0.0123**						**22.4815**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**7-21-2019**	**9-30-2019**	0.2418	0.2418
		Highest	0.2418	0.2418

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2224	9.0000e-005	9.7600e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0202
Energy	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						175.8642
Mobile	0.5118	6.1695	4.6575	0.0235	1.2991	0.0211	1.3202	0.3502	0.0200	0.3702						2,191.6758
Waste						0.0000	0.0000		0.0000	0.0000						97.4774
Water						0.0000	0.0000		0.0000	0.0000						9.3292
Total	**0.7399**	**6.2224**	**4.7116**	**0.0238**	**1.2991**	**0.0252**	**1.3243**	**0.3502**	**0.0240**	**0.3742**						**2,474.3668**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2224	9.0000e-005	9.7600e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0202
Energy	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						175.8642
Mobile	0.5118	6.1695	4.6575	0.0235	1.2991	0.0211	1.3202	0.3502	0.0200	0.3702						2,191.6758
Waste						0.0000	0.0000		0.0000	0.0000						97.4774
Water						0.0000	0.0000		0.0000	0.0000						9.3292
Total	**0.7399**	**6.2224**	**4.7116**	**0.0238**	**1.2991**	**0.0252**	**1.3243**	**0.3502**	**0.0240**	**0.3742**						**2,474.3668**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/21/2019	8/16/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0230	0.2268	0.1489	2.4000e-004		0.0129	0.0129		0.0120	0.0120						21.5524
Total	**0.0230**	**0.2268**	**0.1489**	**2.4000e-004**		**0.0129**	**0.0129**		**0.0120**	**0.0120**						**21.5524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	4.0000e-004	4.0500e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004						0.9291
Total	**6.1000e-004**	**4.0000e-004**	**4.0500e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0500e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**						**0.9291**

3.2 Demolition - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0230	0.2268	0.1489	2.4000e-004		0.0129	0.0129		0.0120	0.0120						21.5524
Total	**0.0230**	**0.2268**	**0.1489**	**2.4000e-004**		**0.0129**	**0.0129**		**0.0120**	**0.0120**						**21.5524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	4.0000e-004	4.0500e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004						0.9291
Total	**6.1000e-004**	**4.0000e-004**	**4.0500e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0500e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**						**0.9291**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5118	6.1695	4.6575	0.0235	1.2991	0.0211	1.3202	0.3502	0.0200	0.3702						2,191.675 8
Unmitigated	0.5118	6.1695	4.6575	0.0235	1.2991	0.0211	1.3202	0.3502	0.0200	0.3702						2,191.675 8

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Day-Care Center	314.93	0.00	0.00	264,908	264,908
Junior College (2Yr)	1,127.00	0.00	0.00	2,044,327	2,044,327
Office Park	603.00	0.00	0.00	1,079,477	1,079,477
Total	2,044.93	0.00	0.00	3,388,712	3,388,712

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Day-Care Center	9.50	7.30	7.30	12.70	82.30	5.00	28	58	14
Junior College (2Yr)	9.50	7.30	7.30	6.40	88.60	5.00	92	7	1
Office Park	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Day-Care Center	0.487139	0.031901	0.169199	0.121386	0.017033	0.004732	0.033028	0.124746	0.002366	0.001590	0.005154	0.001097	0.000629
Junior College (2Yr)	0.487139	0.031901	0.169199	0.121386	0.017033	0.004732	0.033028	0.124746	0.002366	0.001590	0.005154	0.001097	0.000629
Office Park	0.487139	0.031901	0.169199	0.121386	0.017033	0.004732	0.033028	0.124746	0.002366	0.001590	0.005154	0.001097	0.000629

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						118.0468
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						118.0468
NaturalGas Mitigated	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						57.8174
NaturalGas Unmitigated	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						57.8174

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	109285	5.9000e-004	5.3600e-003	4.5000e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004						5.8665
Junior College (2Yr)	944992	5.1000e-003	0.0463	0.0389	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003						50.7281
Office Park	22780	1.2000e-004	1.1200e-003	9.4000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005						1.2229
Total		**5.8100e-003**	**0.0528**	**0.0444**	**3.2000e-004**		**4.0100e-003**	**4.0100e-003**		**4.0100e-003**	**4.0100e-003**						**57.8174**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	109285	5.9000e-004	5.3600e-003	4.5000e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004						5.8665
Junior College (2Yr)	944992	5.1000e-003	0.0463	0.0389	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003						50.7281
Office Park	22780	1.2000e-004	1.1200e-003	9.4000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005						1.2229
Total		**5.8100e-003**	**0.0528**	**0.0444**	**3.2000e-004**		**4.0100e-003**	**4.0100e-003**		**4.0100e-003**	**4.0100e-003**						**57.8174**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	30552.9				6.7954
Junior College (2Yr)	488538				108.6580
Office Park	11660				2.5934
Total					**118.0468**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	30552.9				6.7954
Junior College (2Yr)	488538				108.6580
Office Park	11660				2.5934
Total					**118.0468**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2224	9.0000e-005	9.7600e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0202
Unmitigated	0.2224	9.0000e-005	9.7600e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0202

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0335					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.1880					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	9.1000e-004	9.0000e-005	9.7600e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0202
Total	**0.2224**	**9.0000e-005**	**9.7600e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**						**0.0202**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0335					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.1880					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	9.1000e-004	9.0000e-005	9.7600e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0202
Total	**0.2224**	**9.0000e-005**	**9.7600e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**						**0.0202**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				9.3292
Unmitigated				9.3292

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.186666 / 0.48				0.8524
Junior College (2Yr)	2.09828 / 3.28192				7.9362
Office Park	0.177734 / 0.108934				0.5406
Total					**9.3292**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.186666 / 0.48				0.8524
Junior College (2Yr)	2.09828 / 3.28192				7.9362
Office Park	0.177734 / 0.108934				0.5406
Total					**9.3292**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				97.4774
Unmitigated				97.4774

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	14.05				7.0658
Junior College (2Yr)	178.85				89.9439
Office Park	0.93				0.4677
Total					**97.4774**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	14.05				7.0658
Junior College (2Yr)	178.85				89.9439
Office Park	0.93				0.4677
Total					**97.4774**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Fresno City College Parking & Facilities Expansion Project

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Junior College (2Yr)	980.00	Student	0.98	42,779.19	0
Day-Care Center	77.00	Student	0.10	4,352.26	0
Office Park	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2030
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	488.3	**CH4 Intensity (lb/MWhr)**	0.022	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

Project Characteristics - For quantification of existing operational mobile-source emissions only. Construction and area/stationary source emissions do not

Land Use - College: 980 students; Daycare: 77 students; Maintenance Op: 30 employees; school office: 70 employees; gov office: 23 employees (603 employee trips total).

Construction Phase - Const does not apply

Vehicle Trips - Based on trip-gen derived from the traffic analysis.

Vehicle Emission Factors - Default fleet mix.

Vehicle Emission Factors -

Vehicle Emission Factors -

Energy Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.022
tblProjectCharacteristics	CO2IntensityFactor	641.35	488.3
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.005
tblVehicleTrips	ST_TR	0.39	0.00
tblVehicleTrips	ST_TR	0.42	0.00
tblVehicleTrips	ST_TR	1.64	0.00
tblVehicleTrips	SU_TR	0.37	0.00
tblVehicleTrips	SU_TR	0.04	0.00
tblVehicleTrips	SU_TR	0.76	0.00
tblVehicleTrips	WD_TR	4.38	4.09
tblVehicleTrips	WD_TR	1.23	1.15
tblVehicleTrips	WD_TR	11.42	603.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0236	0.2272	0.1530	2.5000e-004	1.0400e-003	0.0129	0.0139	2.8000e-004	0.0120	0.0123						22.4815
Maximum	**0.0236**	**0.2272**	**0.1530**	**2.5000e-004**	**1.0400e-003**	**0.0129**	**0.0139**	**2.8000e-004**	**0.0120**	**0.0123**						**22.4815**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0236	0.2272	0.1530	2.5000e-004	1.0400e-003	0.0129	0.0139	2.8000e-004	0.0120	0.0123						22.4815
Maximum	**0.0236**	**0.2272**	**0.1530**	**2.5000e-004**	**1.0400e-003**	**0.0129**	**0.0139**	**2.8000e-004**	**0.0120**	**0.0123**						**22.4815**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-21-2019	9-30-2019	0.2418	0.2418
		Highest	0.2418	0.2418

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2223	9.0000e-005	9.6700e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0201
Energy	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						175.8642
Mobile	0.2898	4.1183	2.6020	0.0196	1.2976	8.8200e-003	1.3064	0.3495	8.2700e-003	0.3578						1,839.3575
Waste						0.0000	0.0000		0.0000	0.0000						97.4774
Water						0.0000	0.0000		0.0000	0.0000						9.3292
Total	**0.5180**	**4.1712**	**2.6560**	**0.0199**	**1.2976**	**0.0129**	**1.3105**	**0.3495**	**0.0123**	**0.3618**						**2,122.0484**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2223	9.0000e-005	9.6700e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0201
Energy	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						175.8642
Mobile	0.2898	4.1183	2.6020	0.0196	1.2976	8.8200e-003	1.3064	0.3495	8.2700e-003	0.3578						1,839.3575
Waste						0.0000	0.0000		0.0000	0.0000						97.4774
Water						0.0000	0.0000		0.0000	0.0000						9.3292
Total	**0.5180**	**4.1712**	**2.6560**	**0.0199**	**1.2976**	**0.0129**	**1.3105**	**0.3495**	**0.0123**	**0.3618**						**2,122.0484**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/21/2019	8/16/2019	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0230	0.2268	0.1489	2.4000e-004		0.0129	0.0129		0.0120	0.0120						21.5524
Total	**0.0230**	**0.2268**	**0.1489**	**2.4000e-004**		**0.0129**	**0.0129**		**0.0120**	**0.0120**						**21.5524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	4.0000e-004	4.0500e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004						0.9291
Total	**6.1000e-004**	**4.0000e-004**	**4.0500e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0500e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**						**0.9291**

3.2 Demolition - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0230	0.2268	0.1489	2.4000e-004		0.0129	0.0129		0.0120	0.0120						21.5524
Total	**0.0230**	**0.2268**	**0.1489**	**2.4000e-004**		**0.0129**	**0.0129**		**0.0120**	**0.0120**						**21.5524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.1000e-004	4.0000e-004	4.0500e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004						0.9291
Total	**6.1000e-004**	**4.0000e-004**	**4.0500e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0500e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**						**0.9291**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2898	4.1183	2.6020	0.0196	1.2976	8.8200e-003	1.3064	0.3495	8.2700e-003	0.3578						1,839.3575
Unmitigated	0.2898	4.1183	2.6020	0.0196	1.2976	8.8200e-003	1.3064	0.3495	8.2700e-003	0.3578						1,839.3575

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Day-Care Center	314.93	0.00	0.00	264,908	264,908
Junior College (2Yr)	1,127.00	0.00	0.00	2,044,327	2,044,327
Office Park	603.00	0.00	0.00	1,079,477	1,079,477
Total	2,044.93	0.00	0.00	3,388,712	3,388,712

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Day-Care Center	9.50	7.30	7.30	12.70	82.30	5.00	28	58	14
Junior College (2Yr)	9.50	7.30	7.30	6.40	88.60	5.00	92	7	1
Office Park	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Day-Care Center	0.517186	0.028486	0.175263	0.093589	0.009700	0.003404	0.033644	0.129242	0.002306	0.001185	0.004563	0.000998	0.000436
Junior College (2Yr)	0.517186	0.028486	0.175263	0.093589	0.009700	0.003404	0.033644	0.129242	0.002306	0.001185	0.004563	0.000998	0.000436
Office Park	0.517186	0.028486	0.175263	0.093589	0.009700	0.003404	0.033644	0.129242	0.002306	0.001185	0.004563	0.000998	0.000436

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						118.0468
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						118.0468
NaturalGas Mitigated	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						57.8174
NaturalGas Unmitigated	5.8100e-003	0.0528	0.0444	3.2000e-004		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003						57.8174

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	109285	5.9000e-004	5.3600e-003	4.5000e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004						5.8665
Junior College (2Yr)	944992	5.1000e-003	0.0463	0.0389	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003						50.7281
Office Park	22780	1.2000e-004	1.1200e-003	9.4000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005						1.2229
Total		**5.8100e-003**	**0.0528**	**0.0444**	**3.2000e-004**		**4.0100e-003**	**4.0100e-003**		**4.0100e-003**	**4.0100e-003**						**57.8174**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	109285	5.9000e-004	5.3600e-003	4.5000e-003	3.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004						5.8665
Junior College (2Yr)	944992	5.1000e-003	0.0463	0.0389	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003						50.7281
Office Park	22780	1.2000e-004	1.1200e-003	9.4000e-004	1.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005						1.2229
Total		**5.8100e-003**	**0.0528**	**0.0444**	**3.2000e-004**		**4.0100e-003**	**4.0100e-003**		**4.0100e-003**	**4.0100e-003**						**57.8174**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	30552.9				6.7954
Junior College (2Yr)	488538				108.6580
Office Park	11660				2.5934
Total					**118.0468**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	30552.9				6.7954
Junior College (2Yr)	488538				108.6580
Office Park	11660				2.5934
Total					**118.0468**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2223	9.0000e-005	9.6700e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0201
Unmitigated	0.2223	9.0000e-005	9.6700e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0201

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0335					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.1880					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	8.9000e-004	9.0000e-005	9.6700e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0201
Total	**0.2223**	**9.0000e-005**	**9.6700e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**						**0.0201**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0335					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.1880					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	8.9000e-004	9.0000e-005	9.6700e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005						0.0201
Total	**0.2223**	**9.0000e-005**	**9.6700e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**						**0.0201**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				9.3292
Unmitigated				9.3292

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.186666 / 0.48				0.8524
Junior College (2Yr)	2.09828 / 3.28192				7.9362
Office Park	0.177734 / 0.108934				0.5406
Total					**9.3292**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.186666 / 0.48				0.8524
Junior College (2Yr)	2.09828 / 3.28192				7.9362
Office Park	0.177734 / 0.108934				0.5406
Total					**9.3292**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				97.4774
Unmitigated				97.4774

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	14.05				7.0658
Junior College (2Yr)	178.85				89.9439
Office Park	0.93				0.4677
Total					**97.4774**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	14.05				7.0658
Junior College (2Yr)	178.85				89.9439
Office Park	0.93				0.4677
Total					**97.4774**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Fresno City College Expansion Project

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Junior College (2Yr)	1,110.00	Student	2.50	95,000.00	0
Day-Care Center	119.00	Student	0.75	16,480.00	0
General Light Industry	10.00	1000sqft	0.23	10,000.00	0
General Office Building	1.00	1000sqft	0.02	0.00	0
Unenclosed Parking with Elevator	1,000.00	Space	9.00	400,000.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 45

Climate Zone 3 **Operational Year** 2030

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 364.4 **CH4 Intensity (lb/MWhr)** 0.016 **N2O Intensity (lb/MWhr)** 0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Includes RPS adjustment

Land Use - Land uses and trip gen from traffic analysis

Construction Phase - Based on model defaults.

Demolition - 43400 sf total demo

Architectural Coating - Includes use of low-VOC (50 g/L or less) paints.

Vehicle Trips - Based on trip gen from traffic analysis

Energy Use -

Construction Off-road Equipment Mitigation - Includes 50%CE for watering roads, 61%CE for watering exposed surfaces, 15mph speed limit. T3 for informational purposes.

Energy Mitigation - Includes installation of high-eff. lighting

Water Mitigation - Includes use of low-flow fixtures and water-eff. irrigation systems

Waste Mitigation - Assumes 50% diversion based on current statewide averages

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	150.00	50.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	300.00	275.00
tblConstructionPhase	PhaseEndDate	1/29/2021	12/25/2020
tblConstructionPhase	PhaseEndDate	12/4/2020	10/30/2020
tblConstructionPhase	PhaseEndDate	1/1/2021	11/27/2020
tblConstructionPhase	PhaseStartDate	1/2/2021	11/28/2020
tblConstructionPhase	PhaseStartDate	12/5/2020	11/1/2020
tblLandUse	LandUseSquareFeet	48,453.98	95,000.00
tblLandUse	LandUseSquareFeet	6,726.22	16,480.00

tblLandUse	LandUseSquareFeet	1,000.00	0.00
tblLandUse	LotAcreage	1.11	2.50
tblLandUse	LotAcreage	0.15	0.75
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.016
tblProjectCharacteristics	CO2IntensityFactor	641.35	364.4
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblVehicleTrips	ST_TR	0.39	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	SU_TR	0.37	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	WD_TR	4.38	4.09
tblVehicleTrips	WD_TR	6.97	5.50
tblVehicleTrips	WD_TR	11.03	410.00
tblVehicleTrips	WD_TR	1.23	1.15

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2392	2.3825	1.5918	3.5800e-003	0.3138	0.1053	0.4190	0.1264	0.0979	0.2242						325.8911
2020	0.7522	3.4638	2.8645	7.6900e-003	0.2570	0.1377	0.3947	0.0697	0.1295	0.1992						696.7474
Maximum	**0.7522**	**3.4638**	**2.8645**	**7.6900e-003**	**0.3138**	**0.1377**	**0.4190**	**0.1264**	**0.1295**	**0.2242**						**696.7474**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.1000	1.5119	1.6929	3.5800e-003	0.1663	0.0615	0.2277	0.0612	0.0613	0.1225						325.8908
2020	0.5848	2.8922	3.0027	7.6900e-003	0.2570	0.1129	0.3698	0.0697	0.1125	0.1822						696.7471
Maximum	**0.5848**	**2.8922**	**3.0027**	**7.6900e-003**	**0.2570**	**0.1129**	**0.3698**	**0.0697**	**0.1125**	**0.1822**						**696.7471**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**30.93**	**24.67**	**-5.37**	**0.00**	**25.85**	**28.26**	**26.57**	**33.24**	**23.54**	**28.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-21-2019	10-20-2019	1.6699	0.8831
2	10-21-2019	1-20-2020	1.1968	0.9314
3	1-21-2020	4-20-2020	1.0973	0.8891
4	4-21-2020	7-20-2020	1.0933	0.8852
5	7-21-2020	9-30-2020	0.8651	0.7003
		Highest	1.6699	0.9314

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.5950	1.8000e-004	0.0205	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0426
Energy	0.0147	0.1334	0.1120	8.0000e-004		0.0101	0.0101		0.0101	0.0101						488.8473
Mobile	0.3266	4.6587	2.8933	0.0218	1.4295	9.7600e-003	1.4392	0.3850	9.1500e-003	0.3942						2,041.5286
Waste						0.0000	0.0000		0.0000	0.0000						119.4995
Water						0.0000	0.0000		0.0000	0.0000						14.3024
Total	**0.9362**	**4.7923**	**3.0258**	**0.0226**	**1.4295**	**0.0200**	**1.4495**	**0.3850**	**0.0194**	**0.4044**						**2,664.2204**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.5950	1.8000e-004	0.0205	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0426
Energy	0.0147	0.1334	0.1120	8.0000e-004		0.0101	0.0101		0.0101	0.0101						453.5421
Mobile	0.3266	4.6587	2.8933	0.0218	1.4295	9.7600e-003	1.4392	0.3850	9.1500e-003	0.3942						2,041.5286
Waste						0.0000	0.0000		0.0000	0.0000						59.7497
Water						0.0000	0.0000		0.0000	0.0000						11.8109
Total	**0.9362**	**4.7923**	**3.0258**	**0.0226**	**1.4295**	**0.0200**	**1.4495**	**0.3850**	**0.0194**	**0.4044**						**2,566.6738**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.66**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/21/2019	8/16/2019	5	20	
2	Site Preparation	Site Preparation	8/17/2019	8/30/2019	5	10	
3	Grading	Grading	8/31/2019	10/11/2019	5	30	
4	Building Construction	Building Construction	10/12/2019	10/30/2020	5	275	
5	Paving	Paving	11/1/2020	11/27/2020	5	20	
6	Architectural Coating	Architectural Coating	11/28/2020	12/25/2020	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 75

Acres of Paving: 9

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 182,220; Non-Residential Outdoor: 60,740; Striped Parking Area: 24,000 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	197.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	219.00	85.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	44.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0214	0.0000	0.0214	3.2300e-003	0.0000	3.2300e-003						0.0000
Off-Road	0.0351	0.3578	0.2206	3.9000e-004		0.0180	0.0180		0.0167	0.0167						34.8672
Total	**0.0351**	**0.3578**	**0.2206**	**3.9000e-004**	**0.0214**	**0.0180**	**0.0393**	**3.2300e-003**	**0.0167**	**0.0199**						**34.8672**

3.2 Demolition - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.5000e-004	0.0297	3.9600e-003	8.0000e-005	1.6800e-003	1.2000e-004	1.8000e-003	4.6000e-004	1.1000e-004	5.7000e-004						7.6073
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	7.1000e-004	4.7000e-004	4.6700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004						1.0720
Total	**1.5600e-003**	**0.0302**	**8.6300e-003**	**9.0000e-005**	**2.8800e-003**	**1.3000e-004**	**3.0100e-003**	**7.8000e-004**	**1.2000e-004**	**9.0000e-004**						**8.6793**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.3300e-003	0.0000	8.3300e-003	1.2600e-003	0.0000	1.2600e-003						0.0000
Off-Road	9.2500e-003	0.1831	0.2467	3.9000e-004		8.6300e-003	8.6300e-003		8.6300e-003	8.6300e-003						34.8671
Total	**9.2500e-003**	**0.1831**	**0.2467**	**3.9000e-004**	**8.3300e-003**	**8.6300e-003**	**0.0170**	**1.2600e-003**	**8.6300e-003**	**9.8900e-003**						**34.8671**

3.2 Demolition - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.5000e-004	0.0297	3.9600e-003	8.0000e-005	1.6800e-003	1.2000e-004	1.8000e-003	4.6000e-004	1.1000e-004	5.7000e-004						7.6073
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	7.1000e-004	4.7000e-004	4.6700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004						1.0720
Total	**1.5600e-003**	**0.0302**	**8.6300e-003**	**9.0000e-005**	**2.8800e-003**	**1.3000e-004**	**3.0100e-003**	**7.8000e-004**	**1.2000e-004**	**9.0000e-004**						**8.6793**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497						0.0000
Off-Road	0.0217	0.2279	0.1103	1.9000e-004		0.0120	0.0120		0.0110	0.0110						17.2195
Total	**0.0217**	**0.2279**	**0.1103**	**1.9000e-004**	**0.0903**	**0.0120**	**0.1023**	**0.0497**	**0.0110**	**0.0607**						**17.2195**

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	4.3000e-004	2.8000e-004	2.8000e-003	1.0000e-005	7.2000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	2.0000e-004						0.6432
Total	**4.3000e-004**	**2.8000e-004**	**2.8000e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**						**0.6432**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0352	0.0000	0.0352	0.0194	0.0000	0.0194						0.0000
Off-Road	4.6600e-003	0.0953	0.1148	1.9000e-004		4.7300e-003	4.7300e-003		4.7300e-003	4.7300e-003						17.2195
Total	**4.6600e-003**	**0.0953**	**0.1148**	**1.9000e-004**	**0.0352**	**4.7300e-003**	**0.0400**	**0.0194**	**4.7300e-003**	**0.0241**						**17.2195**

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	4.3000e-004	2.8000e-004	2.8000e-003	1.0000e-005	7.2000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	2.0000e-004						0.6432
Total	**4.3000e-004**	**2.8000e-004**	**2.8000e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**						**0.6432**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540						0.0000
Off-Road	0.0711	0.8178	0.5007	9.3000e-004		0.0357	0.0357		0.0329	0.0329						84.2129
Total	**0.0711**	**0.8178**	**0.5007**	**9.3000e-004**	**0.1301**	**0.0357**	**0.1658**	**0.0540**	**0.0329**	**0.0868**						**84.2129**

3.4 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.4200e-003	9.3000e-004	9.3500e-003	2.0000e-005	2.4000e-003	2.0000e-005	2.4100e-003	6.4000e-004	1.0000e-005	6.5000e-004						2.1440
Total	**1.4200e-003**	**9.3000e-004**	**9.3500e-003**	**2.0000e-005**	**2.4000e-003**	**2.0000e-005**	**2.4100e-003**	**6.4000e-004**	**1.0000e-005**	**6.5000e-004**						**2.1440**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0507	0.0000	0.0507	0.0210	0.0000	0.0210						0.0000
Off-Road	0.0229	0.4497	0.5508	9.3000e-004		0.0195	0.0195		0.0195	0.0195						84.2128
Total	**0.0229**	**0.4497**	**0.5508**	**9.3000e-004**	**0.0507**	**0.0195**	**0.0702**	**0.0210**	**0.0195**	**0.0405**						**84.2128**

3.4 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.4200e-003	9.3000e-004	9.3500e-003	2.0000e-005	2.4000e-003	2.0000e-005	2.4100e-003	6.4000e-004	1.0000e-005	6.5000e-004						2.1440
Total	**1.4200e-003**	**9.3000e-004**	**9.3500e-003**	**2.0000e-005**	**2.4000e-003**	**2.0000e-005**	**2.4100e-003**	**6.4000e-004**	**1.0000e-005**	**6.5000e-004**						**2.1440**

3.5 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0673	0.6008	0.4892	7.7000e-004		0.0368	0.0368		0.0346	0.0346						67.4128
Total	**0.0673**	**0.6008**	**0.4892**	**7.7000e-004**		**0.0368**	**0.0368**		**0.0346**	**0.0346**						**67.4128**

3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0112	0.3275	0.0558	6.9000e-004	0.0161	2.3800e-003	0.0184	4.6400e-003	2.2700e-003	6.9100e-003						66.1067
Worker	0.0295	0.0194	0.1945	4.9000e-004	0.0499	3.3000e-004	0.0502	0.0133	3.0000e-004	0.0136						44.6057
Total	**0.0406**	**0.3469**	**0.2503**	**1.1800e-003**	**0.0660**	**2.7100e-003**	**0.0687**	**0.0179**	**2.5700e-003**	**0.0205**						**110.7124**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0192	0.4054	0.5094	7.7000e-004		0.0258	0.0258		0.0258	0.0258						67.4127
Total	**0.0192**	**0.4054**	**0.5094**	**7.7000e-004**		**0.0258**	**0.0258**		**0.0258**	**0.0258**						**67.4127**

3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0112	0.3275	0.0558	6.9000e-004	0.0161	2.3800e-003	0.0184	4.6400e-003	2.2700e-003	6.9100e-003						66.1067
Worker	0.0295	0.0194	0.1945	4.9000e-004	0.0499	3.3000e-004	0.0502	0.0133	3.0000e-004	0.0136						44.6057
Total	**0.0406**	**0.3469**	**0.2503**	**1.1800e-003**	**0.0660**	**2.7100e-003**	**0.0687**	**0.0179**	**2.5700e-003**	**0.0205**						**110.7124**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2311	2.0913	1.8365	2.9300e-003		0.1218	0.1218		0.1145	0.1145						253.9946
Total	**0.2311**	**2.0913**	**1.8365**	**2.9300e-003**		**0.1218**	**0.1218**		**0.1145**	**0.1145**						**253.9946**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0346	1.1480	0.1833	2.6300e-003	0.0614	6.0900e-003	0.0675	0.0177	5.8300e-003	0.0236						250.6359
Worker	0.1030	0.0654	0.6635	1.8300e-003	0.1908	1.2300e-003	0.1921	0.0507	1.1300e-003	0.0519						165.2833
Total	**0.1377**	**1.2134**	**0.8468**	**4.4600e-003**	**0.2522**	**7.3200e-003**	**0.2596**	**0.0685**	**6.9600e-003**	**0.0754**						**415.9192**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0735	1.5506	1.9482	2.9300e-003		0.0985	0.0985		0.0985	0.0985						253.9943
Total	**0.0735**	**1.5506**	**1.9482**	**2.9300e-003**		**0.0985**	**0.0985**		**0.0985**	**0.0985**						**253.9943**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0346	1.1480	0.1833	2.6300e-003	0.0614	6.0900e-003	0.0675	0.0177	5.8300e-003	0.0236						250.6359
Worker	0.1030	0.0654	0.6635	1.8300e-003	0.1908	1.2300e-003	0.1921	0.0507	1.1300e-003	0.0519						165.2833
Total	**0.1377**	**1.2134**	**0.8468**	**4.4600e-003**	**0.2522**	**7.3200e-003**	**0.2596**	**0.0685**	**6.9600e-003**	**0.0754**						**415.9192**

3.6 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0136	0.1407	0.1465	2.3000e-004		7.5300e-003	7.5300e-003		6.9300e-003	6.9300e-003						20.1902
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0136**	**0.1407**	**0.1465**	**2.3000e-004**		**7.5300e-003**	**7.5300e-003**		**6.9300e-003**	**6.9300e-003**						**20.1902**

3.6 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.5000e-004	4.1000e-004	4.1700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004						1.0386
Total	**6.5000e-004**	**4.1000e-004**	**4.1700e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**						**1.0386**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6100e-003	0.1130	0.1730	2.3000e-004		6.0900e-003	6.0900e-003		6.0900e-003	6.0900e-003						20.1901
Paving	0.0000					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**5.6100e-003**	**0.1130**	**0.1730**	**2.3000e-004**		**6.0900e-003**	**6.0900e-003**		**6.0900e-003**	**6.0900e-003**						**20.1901**

3.6 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	6.5000e-004	4.1000e-004	4.1700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004						1.0386
Total	**6.5000e-004**	**4.1000e-004**	**4.1700e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**						**1.0386**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3650					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	2.4200e-003	0.0168	0.0183	3.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003						2.5582
Total	**0.3674**	**0.0168**	**0.0183**	**3.0000e-005**		**1.1100e-003**	**1.1100e-003**		**1.1100e-003**	**1.1100e-003**						**2.5582**

3.7 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.9000e-003	1.2000e-003	0.0122	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.6000e-004						3.0466
Total	**1.9000e-003**	**1.2000e-003**	**0.0122**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.3000e-004**	**2.0000e-005**	**9.6000e-004**						**3.0466**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3650					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	5.9000e-004	0.0136	0.0183	3.0000e-005		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004						2.5582
Total	**0.3656**	**0.0136**	**0.0183**	**3.0000e-005**		**9.5000e-004**	**9.5000e-004**		**9.5000e-004**	**9.5000e-004**						**2.5582**

3.7 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.9000e-003	1.2000e-003	0.0122	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.6000e-004						3.0466
Total	**1.9000e-003**	**1.2000e-003**	**0.0122**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.3000e-004**	**2.0000e-005**	**9.6000e-004**						**3.0466**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.3266	4.6587	2.8933	0.0218	1.4295	9.7600e-003	1.4392	0.3850	9.1500e-003	0.3942						2,041.5286
Unmitigated	0.3266	4.6587	2.8933	0.0218	1.4295	9.7600e-003	1.4392	0.3850	9.1500e-003	0.3942						2,041.5286

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Day-Care Center	486.71	0.00	0.00	409,403	409,403
General Light Industry	55.00	13.20	6.80	123,037	123,037
General Office Building	410.00	0.00	0.00	699,856	699,856
Junior College (2Yr)	1,276.50	466.20	44.40	2,500,755	2,500,755
Unenclosed Parking with Elevator	0.00	0.00	0.00		
Total	2,228.21	479.40	51.20	3,733,050	3,733,050

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Day-Care Center	9.50	7.30	7.30	12.70	82.30	5.00	28	58	14
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Junior College (2Yr)	9.50	7.30	7.30	6.40	88.60	5.00	92	7	1
Unenclosed Parking with El...	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Day-Care Center	0.517186	0.028486	0.175263	0.093589	0.009700	0.003404	0.033644	0.129242	0.002306	0.001185	0.004563	0.000998	0.000436
General Light Industry	0.517186	0.028486	0.175263	0.093589	0.009700	0.003404	0.033644	0.129242	0.002306	0.001185	0.004563	0.000998	0.000436
General Office Building	0.517186	0.028486	0.175263	0.093589	0.009700	0.003404	0.033644	0.129242	0.002306	0.001185	0.004563	0.000998	0.000436
Junior College (2Yr)	0.517186	0.028486	0.175263	0.093589	0.009700	0.003404	0.033644	0.129242	0.002306	0.001185	0.004563	0.000998	0.000436
Unenclosed Parking with Elevator	0.517186	0.028486	0.175263	0.093589	0.009700	0.003404	0.033644	0.129242	0.002306	0.001185	0.004563	0.000998	0.000436

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						307.4729
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						342.7782
NaturalGas Mitigated	0.0147	0.1334	0.1120	8.0000e-004		0.0101	0.0101		0.0101	0.0101						146.0692
NaturalGas Unmitigated	0.0147	0.1334	0.1120	8.0000e-004		0.0101	0.0101		0.0101	0.0101						146.0692

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	413813	2.2300e-003	0.0203	0.0170	1.2000e-004		1.5400e-003	1.5400e-003		1.5400e-003	1.5400e-003						22.2139
General Light Industry	208700	1.1300e-003	0.0102	8.5900e-003	6.0000e-005		7.8000e-004	7.8000e-004		7.8000e-004	7.8000e-004						11.2032
General Office Building	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Junior College (2Yr)	2.09855e+006	0.0113	0.1029	0.0864	6.2000e-004		7.8200e-003	7.8200e-003		7.8200e-003	7.8200e-003						112.6521
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0147**	**0.1334**	**0.1120**	**8.0000e-004**		**0.0101**	**0.0101**		**0.0101**	**0.0101**						**146.0692**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Day-Care Center	413813	2.2300e-003	0.0203	0.0170	1.2000e-004		1.5400e-003	1.5400e-003		1.5400e-003	1.5400e-003						22.2139
General Light Industry	208700	1.1300e-003	0.0102	8.5900e-003	6.0000e-005		7.8000e-004	7.8000e-004		7.8000e-004	7.8000e-004						11.2032
General Office Building	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Junior College (2Yr)	2.09855e+006	0.0113	0.1029	0.0864	6.2000e-004		7.8200e-003	7.8200e-003		7.8200e-003	7.8200e-003						112.6521
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Total		**0.0147**	**0.1334**	**0.1120**	**8.0000e-004**		**0.0101**	**0.0101**		**0.0101**	**0.0101**						**146.0692**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	115690				19.2058
General Light Industry	88200				14.6422
General Office Building	0				0.0000
Junior College (2Yr)	1.0849e +006				180.1055
Unenclosed Parking with Elevator	776000				128.8247
Total					**342.7782**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Day-Care Center	107806				17.8969
General Light Industry	83880				13.9250
General Office Building	0				0.0000
Junior College (2Yr)	996436				165.4195
Unenclosed Parking with Elevator	664000				110.2314
Total					**307.4729**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5950	1.8000e-004	0.0205	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0426
Unmitigated	0.5950	1.8000e-004	0.0205	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0426

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0928					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.5003					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	1.8700e-003	1.8000e-004	0.0205	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0426
Total	**0.5950**	**1.8000e-004**	**0.0205**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**						**0.0426**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0928					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	0.5003					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	1.8700e-003	1.8000e-004	0.0205	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005						0.0426
Total	**0.5950**	**1.8000e-004**	**0.0205**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**						**0.0426**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				11.8109
Unmitigated				14.3024

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.288485 / 0.741817				1.0828
General Light Industry	2.3125 / 0				5.2250
General Office Building	0.177734 / 0.108934				0.4649
Junior College (2Yr)	2.37662 / 3.71728				7.5297
Unenclosed Parking with Elevator	0 / 0				0.0000
Total					**14.3024**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Day-Care Center	0.230788 / 0.696567				0.9262
General Light Industry	1.85 / 0				4.1800
General Office Building	0.142187 / 0.102289				0.3807
Junior College (2Yr)	1.9013 / 3.49052				6.3240
Unenclosed Parking with Elevator	0 / 0				0.0000
Total					**11.8109**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				59.7497
Unmitigated				119.4995

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	21.72				10.9230
General Light Industry	12.4				6.2360
General Office Building	0.93				0.4677
Junior College (2Yr)	202.57				101.8728
Unenclosed Parking with Elevator	0				0.0000
Total					**119.4995**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Day-Care Center	10.86				5.4615
General Light Industry	6.2				3.1180
General Office Building	0.465				0.2339
Junior College (2Yr)	101.285				50.9364
Unenclosed Parking with Elevator	0				0.0000
Total					**59.7497**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX 3

Cultural Resources Assessment / Historic Architectural Survey Report

Historic Architectural Survey Report (HASR)
for a

Proposed Parking and Facilities Expansion Project

Fresno City College

Prepared by: Karana Hattersley-Drayton, M.A.
Architectural Historian

Prepared for: Scott Odell, AICP
Odell Planning and Research Inc.
49346 Road 426 Suite 2
Oakhurst, CA 93644

June 10, 2019

Summary of Findings

The State Center Community College District (SCCCD) proposes to implement a Parking and Facilities Expansion Project on and adjacent to the Fresno City College Campus. As required by the California Environmental Quality Act (CEQA) the District will prepare an Environmental Impact Report (EIR) pursuant to State CEQA Guidelines. A Notice of Preparation for a Draft Environmental Impact Report (DEIR) was issued on April 11, 2019.

This report documents the efforts to identify historic properties that may be affected directly or indirectly by the proposed project pursuant to 36 CFR 800.4 (d) (1). The report also fulfills California Environmental Quality Act (CEQA) requirements that mandate public agencies determine whether a project will have a significant impact on important historical resources. A substantial adverse change in the significant qualities of a historical resource is considered a significant impact. As defined by CEQA, in part, a “historical resource” is a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR) [14 California Code of Regulations (CCR) 15064.5 (a)(3)].

The proposed project is non-contiguous and includes seven separate sites within or adjacent to the current campus footprint (see Figure 1, Project Site Map). No historic resources were identified on any of the parcels. Although the campus includes two designated historic resources including the Old Administration Building (1916/NR and Local Register) as well as the Fresno City College Library (1931, Local Register), neither resource will be impacted by the proposed project. In addition, the Porter Tract Historic District (Local Register) is on the north side of the campus and also will not be adversely affected by this project.

Karana Hattersley-Drayton, M.A. who meets the Secretary of the Interior's Professional Qualifications as an architectural historian and historian, was retained by the District to prepare the following report. Ms. Drayton based the report on archival research and on site visits on May 5 and June 8, 2019.

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Project Description

The State Center Community College District proposes to implement a Parking and Facilities Expansion Project on and adjacent to the northeast portion of the existing Fresno City College campus. The proposed project will be built over a five year period and will include seven major sites:

1) Construction of a five level parking structure located on the south side of Cambridge and west of Blackstone. This structure will include acquisition of three parcels including an extant 2930 sf duplex located at 1622-24 E. Cambridge Avenue.

2) Construction of a three-story Science Building with surface parking to be located at the current site of the Maintenance and Operations facility on the southwest corner of Blackstone and Weldon. The Operations complex will be demolished and relocated.

3) Replacement of the existing one-story Child Development Center located at 1525 E. Weldon Avenue with a new one-story Center at the current site.

4) Construction of a one-story 10,000 sf Maintenance and Operations building plus a

5) Parking and storage area on the north side of San Pablo Avenue at E. Yale Avenue.

6) The existing District administration building located on the north side of Weldon will be re-purposed to include the SCCCD Police Department.

7) Two parcels located at 1805-1835 Blackstone Avenue will be acquired for future educational facilities.

To accommodate these projects seven parcels adjacent to the north and east of the existing FCC campus will be acquired:

- Two parcels located at 1805-1835 Blackstone Avenue will be acquired for future educational facilities. The site currently includes two c1980s buildings including Ratcliff Auto Sales and a complex with several small businesses.
- Three parcels located at or adjacent to 1622-24 E. Cambridge will be used for a portion of the proposed parking structure. The acquisition will require the demolition of the duplex on site which was constructed in 2002.
- Two parcels located next to the BNSF tracks on the east side of Yale Avenue at San Pablo will be acquired for the parking and storage space for the new Maintenance and Operations facility. A duplex addressed as 1249 E. Yale will be demolished.

Regulatory Context

The California Environmental Quality Act (1970) requires consideration of project impacts on archaeological or historical sites deemed to be “historical resources.” A substantial adverse change in the significant qualities of a historical resource is considered a significant impact. For the purposes of CEQA, a “historical resource” is a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR). Historical resources may include, but are not limited to:

> *A resource included in a local register of historical resources… or identified in an historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code…*
>
> *Any object, building, structure, site, area, place, record or manuscript which a lead agency determines to be historically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. . .[14 California Code of Regulations (CCR) 15064.5(a)(3)].*

Research Methods

Ms. Hattersley-Drayton conducted on-line and archival research and made site visits on May 5 and June 8, 2019 to photograph the parcels and record buildings in the neighborhood. As the former Historic Preservation Officer for the City of Fresno Ms. Drayton was able to access prior research as appropriate for nearby projects. She also reviewed Sanborn fire insurance maps for the project area from 1919 to 1963.

Overview

Early History and Development of Fresno

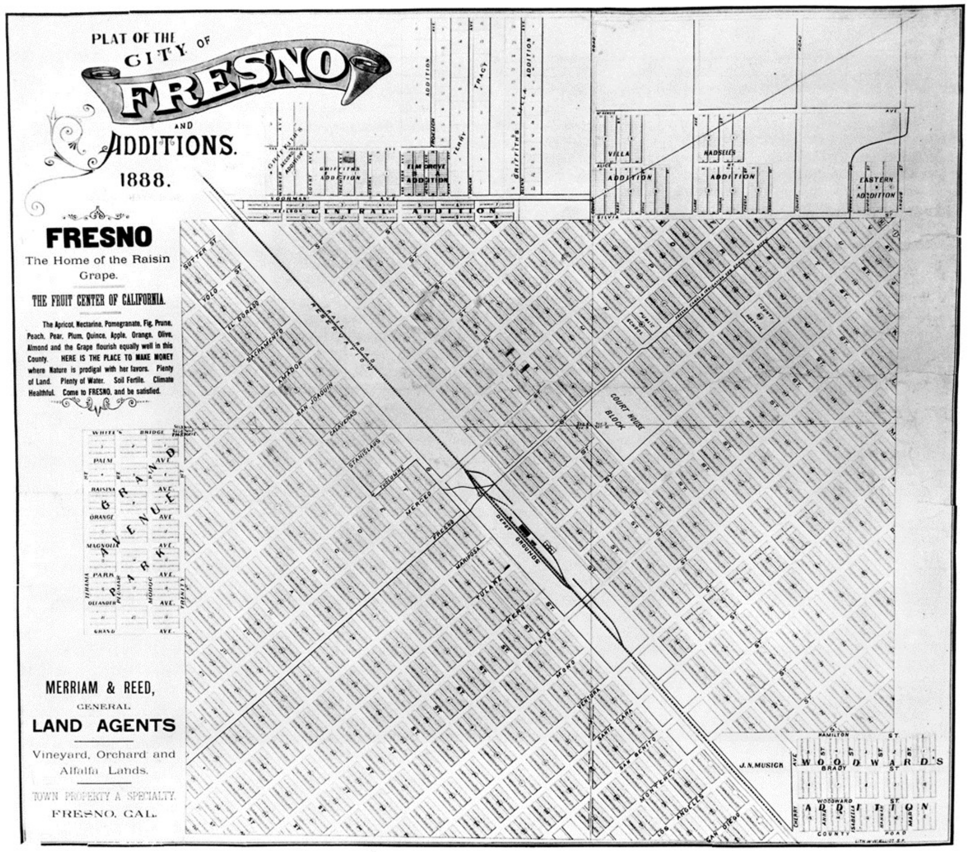
The Yokuts were the first residents of the Fresno area, with small tribes occupying the floodplains of the Big Dry Creek and Little Dry Creek (Gayton 1948:153; Latta 1997:163). Although there were no missions established in the Valley, there were small Mexican era settlements including Pueblo de las Junta, located at the confluence of the San Joaquin River and the Fresno Slough (Hoover 1990: 86). The Spanish and Mexican influence is indicated through place names such as "Fresno," which means "ash tree" and which was first applied to the Fresno River (Hoover et al 1990:85). Following the Gold Rush of 1849, miners were drawn to the southern gold fields, and cattle ranchers and dryland farmers moved into the area. Three momentous changes occurred in the 1870s, which dramatically affected settlement patterns and history: the construction of the Central Pacific Railroad, the introduction of agricultural colonies and the concomitant development of a labyrinth of canals to bring water to these colonies.

In 1870 the Central Pacific Railroad began its diagonal push down the San Joaquin Valley. New towns were surveyed along the corridor---several were planned by the railroad itself---and earlier villages situated away from the tracks often vanished overnight. In 1872 the railroad reached what is now Fresno. The Contract and Finance Company, a subsidiary of the Central Pacific Railroad, bought 4,480 acres in a desolate area where Dry Creek drained into the plains. Surveyor Edward H. Mix laid out the new town in blocks 320 feet by 400 feet, with 20 foot alleys, lots 25×150 feet fronting on 80-foot wide streets parallel to and on both sides of the tracks (Clough 1984:121). The gridiron plan was filed in 1873 and was remarkably rigid, broken only by the space reserved for a future courthouse and the broad swaths through the center of town for the tracks, depot and yards (Reps 1979:187).

Fresno's location was uninviting at best, with barren sand plains in all directions. The nearest substantial supplies of water were the San Joaquin River, 10 miles to the north (Reps 1979:187) and the Kings River further south. Fresno grew slowly but in 1874 it was able to wrestle the county seat away from the former mining town of Millerton (Hoover 1990:88).

1888 Map Fresno

(Rep 1979:190)



The population of Fresno in 1875 was 600, with a third of the residents Chinese who lived west of the tracks. In 1878, a new resident, R.W. Riggs described the community as "not much of a town, a handful of houses in a desert of sand" (Reps 1979:187). Fresno's population was 1,112 in 1880 and 3,464 in 1885. "Yet the town remained a collection of buildings on the prairie rather than a full-fledged city. There was no police force, sewer system or truly efficient fire department, and cattle were still roaming the dusty streets that became winter lakes" (Clough 1984:141).

The 1880s, however, were prosperous years and the desert was turned into profitable farmland with the introduction of irrigation and agricultural colonies. The model for the system that ultimately served throughout the San Joaquin Valley was the Central California Colony, established in 1875 three miles south of Fresno. The Colony was the "brainchild" of Bernard Marks, a German immigrant who approached William S. Chapman, one of the wealthiest landowners in California, with his vision of 20-acre family owned farms sharing a secured source of water. Marks saw the potential for farming in the desert-like environment of San Joaquin Valley if irrigation could be guaranteed (Panter 1994:2). He surveyed six sections of land owned by Chapman and investor William Martin and subdivided the land into 192 20-acre parcels. Three laterals from the Kings River and Fresno Canal were extended into the tracts and water rights were sold to the prospective farmers. Twenty-three miles of roads were laid out and bordered with trees (Panter 1994; Rehart and Patterson 1988:7). Many of the earliest settlers were former miners as well as Scandinavian immigrants: Danes, Swedes and Norwegians (Rehart and Patterson 1988:8). By 1903 there were 48 separate colonies or tracts in Fresno County representing approximately 71,080 acres (Panter 1994:9). These colonies helped to break up the vast estates and initiated what agricultural historian Donald Pisani has termed "the horticultural small-farm phase" of California agriculture (Datel 1999:97).

Fresno was incorporated in 1885. With incorporation, street grades and town lot numbers were established (Clough 1984:319). In November 1887, 1,100 deeds were filed at the county courthouse and the last of the original railroad lots in Fresno were sold. By 1890 the population of Fresno was over 10,000, and land outside of the original town site was subdivided into streets and lots (Reps 1979:191). The first streetcars were introduced in 1892, and this greater mobility allowed for the construction of a variety of streetcar suburbs (Bulbulian 2001:38; Clough 1984:319). Van Ness Boulevard, for example, was developed to link Fresno and the San Joaquin River. Van Ness led to the prestigious Fig Garden residential area (Fresno Bee 25 May 1985).

The “west” side of the Southern Pacific tracks quickly became “Chinatown,” where Chinese, as well as disreputable whites, were forced to settle. The 1898 Sanborn Map shows a remarkably dense in-fill of saloons, lodging houses, lottery and gambling parlors between G, Mariposa, F and Kern Streets. A Chinese theatre is noted on China Alley and a Joss House faced G Street (1898 Sanborn Map of Fresno).

In addition to Chinese and Scandinavian farmers, other early ethnic groups in the Fresno area included Germans from Russia, Japanese and Armenians. The first Armenians arrived in 1881 and eventually settled in an area between the Santa Fe and Southern Pacific tracks appropriately called "Armenian Town" (Bulbulian 2001:37-38). African-Americans were also present early on and organized an African Methodist Church in 1882 (Clough 1984:137).

The raisin industry developed in the 1870s, after the scorching heat of 1875 dried grapes on the vine (Hoover 1990:91). Martin Theodore Kearney who left employment with the Central California Colony and eventually became one of the wealthiest landowners in the area served as the President of the first California Raisin Growers Association from 1898 to 1904. The Sun-Maid Raisin Cooperative was founded in 1911 and became one of the most successful in America. Fresno became the principal-packing center for the raisin grape industry with numerous packinghouses in the city. Other crops such as figs and stone fruits helped to diversify the local economy and Fresno became the market town for a large portion of the San Joaquin Valley (Reps 1979:192). It is now a city of 500,000 and the center of the richest agricultural county in the United States (Haslam 1993:194).

The Development of Fresno's Downtown

The 1887 boom in agriculture and land values brought prosperity to Fresno. In 1889 alone, buildings with an estimated value of 1 million dollars were erected along Mariposa Street in the heart of "downtown". The Depression of 1893 had little effect on Fresno, probably due to its agricultural base. The architectural style of most of the hotels and business blocks was "high Victorian" with construction of brick, iron and glass with French Renaissance inspired mansard roofs, towers and gable dormer windows topped with decorative finials.

Courthouse Square,
Mariposa and K (Van Ness) c1910

Beginning in the early 20th century the City's downtown was completely transformed: the elegant "Victorian" style blocks and hotels were demolished or in the case of smaller buildings were eventually refaced with a "modern" storefront. What emerged was a more "rational" Classic Revival city, one influenced by the latest trends in architectural design emanating from American cities such as New York, Chicago and San Francisco as well as Paris, France (Powell 1983:2; Powell 2008:52).

The building boom in downtown Fresno was halted when the Depression hit in 1929. In the 1960s Redevelopment permanently altered the downtown landscape with the demolition of numerous buildings, including the Carnegie-financed library and original City Hall. Both of these buildings were replaced by parking lots.

<u>Expansion of the City North and Fresno City College</u>

Beginning in the 1880s subdivisions were added north of Fresno's original railroad town. Although the "parent grid" of the city was parallel to the Central Pacific tracks, these new subdivisions were laid out to line up with the surrounding agricultural sections with streets oriented north-south and east-west. Settlement north of the railroad town was facilitated by the development of street car lines, in particular the Forthcamp Avenue Line (1902) along what is now Fulton Street. The extension of the Forthcamp Avenue Line in 1908, as well as the relocation of the Fresno State Normal School in 1913 (which later became Fresno State University and ultimately Fresno City College), were instrumental in opening what is now the Fresno High, Tower and Fresno City College areas to residential and commercial use.

One of the many planned new residential tracts was the College Addition which was platted in November 1912. One portion of this Addition, the Porter Tract, lies on the north boundary of the campus between Weldon Avenue on the south, Maroa Avenue on the west, Yale Avenue on the north and College Avenue on the east. The neighborhood was developed by John G. Porter and includes 2-story homes in a diversity of architectural styles. The Porter

Tract was designated as Fresno's first historic district by the City Council in April 2001 (Guide to Historic Architecture accessed May 5, 2019).

Fresno City College, the oldest two-year college in the State of California, opened in 1910 in the first Fresno High School building, with three teachers and an enrollment of 28 students. The original site of the junior college, in the block bounded by Stanislaus, O, Tuolumne and P Streets is a State Landmark (SRL 803) (Hoover 1990:90). By 1913 the school relocated to its present site and went through a series of mergers with first the Fresno State Normal School (to train teachers) and later with Fresno State College. Ultimately Fresno State College (now Fresno State University) moved to its site on Shaw Avenue and by 1956 Fresno City College was firmly established at its University Avenue location.

Sanborn Fire Insurance Maps for the year 1919 through 1963 depict the transition and growth of the college. The 1919 map depicts what is now called the Old Administration Building (OAB) which included an auditorium, classrooms and two quads. Outbuildings included a small dining room to the east of the OAB and an auto shed, gymnasium, tennis courts and "bathing pool" to the north. All buildings were located on the one parcel bounded by Weldon on the north, N. Van Ness on the west, and University Avenue on the south. Several homes had been constructed in the Porter Tract on the north edge but the east and south sides of the campus were subdivided but with no buildings. The school is referred to as the "Fresno State Normal School."

"Old Administration Building" (1916, National Register of Historic Places)

By 1948 the site was known as Fresno State College and a “College Training School” had been constructed on Weldon Avenue just north of the Old Administration Building. The Library Building was depicted at its current location. A Student Union Building and McLane Hall for Science and Chemistry were located on the south side of Weldon bounded by Del Mar on the east and University on the south. Classrooms and a nursery were located between Poplar, Weldon and the railroad tracks (which separated incidentally the City of Fresno from the County). The residential neighborhood east of the school was partially infilled.

By the 1963 Sanborn Map “Fresno City College” had expanded east to the west side of San Pablo thus removing any residential buildings with the exception of a small cluster at Weldon at the railroad corridor. A gymnasium and pool complex were located north of Weldon between College and the tracks.

Findings and Conclusions

The proposed project entails work at seven separate sites within and adjacent to the existing campus. No historic properties are located at any of these locations nor will the proposed work significantly impact the two designated historic resources on the campus nor the Porter Tract Historic District on the northern boundary. The seven sites are either vacant or include buildings which are not eligible for listing on the National, California or Local Historic Registers.

Regulatory Context

The California Environmental Quality Act (1970) requires consideration of project impacts on archaeological or historical sites deemed to be "historical resources." A substantial adverse change in the significant qualities of a historical resource is considered a significant impact. For the purposes of CEQA, a "historical resource" is a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR). Historical resources may include, but are not limited to:

> *A resource included in a local register of historical resources… or identified in an historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code…*
>
> *Any object, building, structure, site, area, place, record or manuscript which a lead agency determines to be historically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. . .[14 California Code of Regulations (CCR) 15064.5(a)(3)].*

The eligibility criteria for the California Register are the definitive criteria for assessing the significance of historical resources for the purposes of CEQA (Office of Historic Preservation n.d.). Generally, a resource shall be considered "historically significant" if it meets the criteria for listing on the CRHR, as defined in the Public Resources Code (PRC) below, and it has been found and/or treated eligible by the State Historical Resources Commission or the local agency:

> *(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.*

(2)   Is associated with the lives of persons important in our past.

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

(4) Has yielded, or may be likely to yield, information important in prehistory or history. [PRC 5024.1(c)].

<u>Eligibility to the National, State and/or Local Registers</u>

No federal funds or federal permits are anticipated for this proposed project. Thus each site was evaluated under CEQA guidelines only and for the potential of the proposed infill on the parcel(s) to significantly impact a historic resource.

Map reference 1) Construction of a five level parking structure located on the south side of Cambridge west of Blackstone. The proposed project will be built on an existing parking lot and the adjacent three parcels which includes a duplex located at 1622-24 E. Cambridge Avenue. By necessity the duplex will be demolished. The residence was constructed in 2002 and is a common property type for the Fresno area. It is less than 50 years of age and is thus not a historic resource for the purposes of the California Environmental Quality Act.

Existing parking lot and vacant parcel

1622-24 E. Cambridge Avenue

Located on the east side of Cambridge, thus directly across the street from the proposed 5-story parking structure are several homes, dating from the 1920s through the 1940s. The addition of such an imposing garage would have a significant impact on these resources were they individually or collectively historic. However, none of the residences are architecturally significant and there is no potential for a historic district in this neighborhood which has been significantly altered over the years.

1607 E. Cambridge Avenue
(APN: 444-173-13) (first renovated 1925)

1613 E. Cambridge (1947, APN: 444-173-122)

Map Reference 2) Construction of a three-story Science Building with surface parking to be located at the current site of the Maintenance and Operations facility on the southwest corner of Blackstone and Weldon. The Operations complex would be demolished and relocated. There is an extensive complex of buildings on this site. None appear to be more than 50 years of age. Additionally, they are typical utilitarian structures.

Maintenance and Operations Facilities

Map Reference 3) Replacement of the existing one-story Child Development Center located at 1525 E. Weldon Avenue with a new one-story Center at the current site. The CDC was constructed circa 1986 and is thus considerably less than 50 years of age. It is also a typical utilitarian building and is thus not a historical resource for the purposes of CEQA.

Child Development Center 1525 E. Weldon

Map Reference 4) Construction of a one-story 10,000 sf Maintenance and Operations Building on the north side of San Pablo Avenue.

The new Maintenance and Operations Building is slated to be constructed on an existing parking lot located at the northwest corner of E. Yale and N. San Pablo Avenues. The immediate neighborhood contains a mix of older residences and new apartment complexes. The one story building will not significantly alter the existing ambiance.

Map Reference 5) A parking and storage area will be constructed on two lots where E. Yale Avenue dead ends at the railroad corridor, thus directly across from the new Maintenance and Operations Building. One parcel is vacant. A second, with an address of 1249 E. Yale Avenue, has a vacant and boarded duplex and detached garage, constructed in 1950. The duplex is a typical utilitarian stucco clad box from the era and is not eligible for listing on the National, California or Local Registers and is thus not a historical resource for the purposes of the California Environmental Quality Act.

Map Reference 6) The existing District administration building located on the north side of Weldon will be redesigned to include the SCCCD Police Department. Alterations to an existing post 1970 building is a categorical exemption under CEQA. No date is available for this building located at 1525 E. Weldon, but it appears to be circa 1980s.

Map Reference 7) Finally, two parcels located at 1805-1835 will be acquired for future educational facilities. The site currently includes two c1980s buildings including Ratcliff Auto Sales and a complex with several small businesses. According to the owner (5 May 2019) the buildings were constructed in the 1980s.

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Preparer's Qualifications

Karana Hattersley-Drayton has a B.A., an M.A. and completed three years of Ph. D. work in Architectural History, all at U.C. Berkeley. She previously served on the California State Historical Resources Commission as well as the Board of Directors for the Vernacular Architecture Forum. She edited and wrote several articles for the 2008 VAF publication, “Architecture, Ethnicity and Historic Landscapes of California's San Joaquin Valley” which won both a California Preservation Foundation award as well as a Governor's Historic Preservation award. Ms. Drayton moved to the San Joaquin Valley in 1999 to work as an Architectural Historian for Caltrans, District 06 and from 2002 to January 2017 served as the City of Fresno's Historic Preservation Project Manager. Her special interests include the adobe buildings of the San Joaquin Valley, vernacular architecture, and gendered and ethnic landscapes.

APPENDIX 4

Energy Impact Analysis

ENERGY IMPACT ASSESSMENT

FOR THE PROPOSED

FRESNO CITY COLLEGE PARKING & FACILITIES EXPANSION PROJECT

STATE CENTER COMMUNITY COLLEGE DISTRICT

FRESNO, CA

JULY 2019

PREPARED FOR:

ODELL PLANNING & RESEARCH, INC.
49346 ROAD 426, SUITE 2
OAKHURST, CA 93644

PREPARED BY:

AMBIENT
AIR QUALITY & NOISE CONSULTING

612 12TH STREET, SUITE 201
PASO ROBLES, CA 93446
TEL: 805.226.2727

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LIST OF COMMON TERMS & ACRONYMS

AFV	Alternative Fuel Vehicles
CalEEMod	California Emissions Estimator Model
CARB	California Air Resource Board
CEQA	California Environmental Quality ACt
CHP	Combined Heat and Power
DSG	Department of General Services
EMFAC	Emissions Factor
EO	Executive Order
EPA	Environmental Protection Agency
GHG	Greenhouse Gas
kBTU	Kilo British Thermal Units
kW	Kilowatt
kWh	Kilowatt Hour
LEED	Leadership in Energy and Environmental Design
MW	Megawatt
PG&E	Pacific Gas and Electric
PV	Photovoltaic
SCAQMD	South Coast Air Quality Management District
SJVAPCD	San Joaquin Valley Air Pollution Control District
USDOT	U.S. Department of Transportation
VMT	Vehicle Mile Travelled

INTRODUCTION

This report provides an analysis of potential energy impacts associated with the proposed Fresno City College Parking and Facilities Expansion Project. This report also provides a summary of existing conditions in the project area and the applicable regulatory framework pertaining to energy.

PROPOSED PROJECT SUMMARY

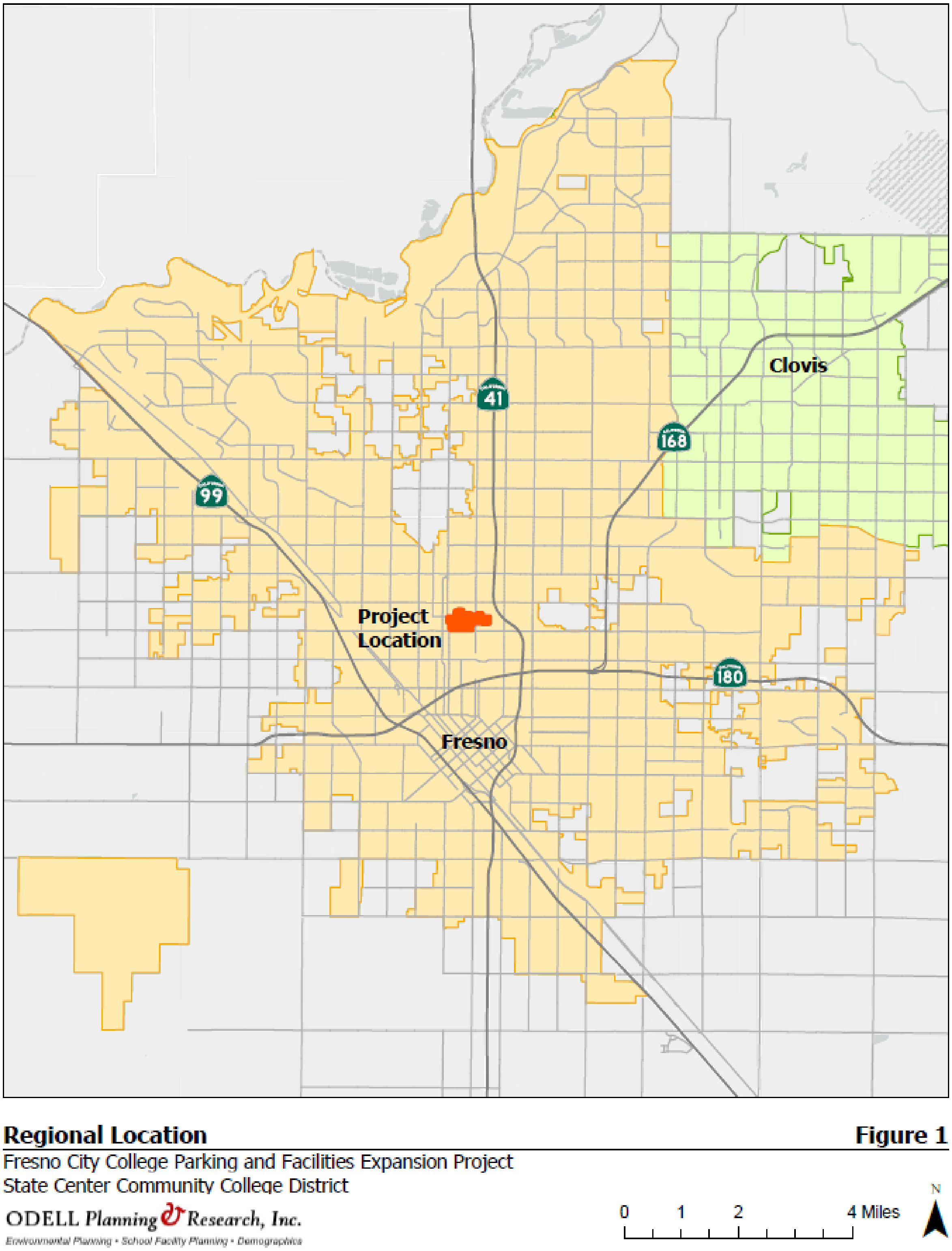
The proposed project includes expansion of various onsite parking and facilities at Fresno City College. The project location is depicted in Figures 1 and 2. The following facilities and activities are planned as part of the project. Development of the facilities would occur over the next five years.

- Construction of a parking structure on the south side of Cambridge Avenue west of Blackstone Avenue located north of the existing district office building. The proposed parking structure would have capacity for up to 1,000 parking spaces, include up to five levels of parking, and include ingress/egress points at Weldon Avenue and potentially Cambridge Avenue.
- Construction of a three-story Science Building (approximately 95,000 square feet) located near the southwest corner of Blackstone and Weldon Avenues. The new Science Building is proposed to include 6 biology labs, 3 anatomy and physiology labs, 5 chemistry labs, 2 physics labs, 2 engineering labs, a computer lab, 3 general educational classrooms, 4 Design Science (Middle College) classrooms, welcome center, tutorial space, and 34 faculty offices. Surface parking would also be added adjacent to the building. Existing Maintenance & Operations facilities located in this area would be removed and relocated to a different area of the campus (see below).
- Replacement of the existing one-story, 5,255 square-foot Child Development Center with a new one-story, 16,480 square-foot Child Development Center at its current location.
- Construction of a one-story, 10,000 square-foot Maintenance & Operations building plus a parking and storage area on the west side of San Pablo Avenue northwest of the existing Health Sciences Building.
- Repurposing of the existing District administration building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department.

ENERGY FUNDAMENTALS

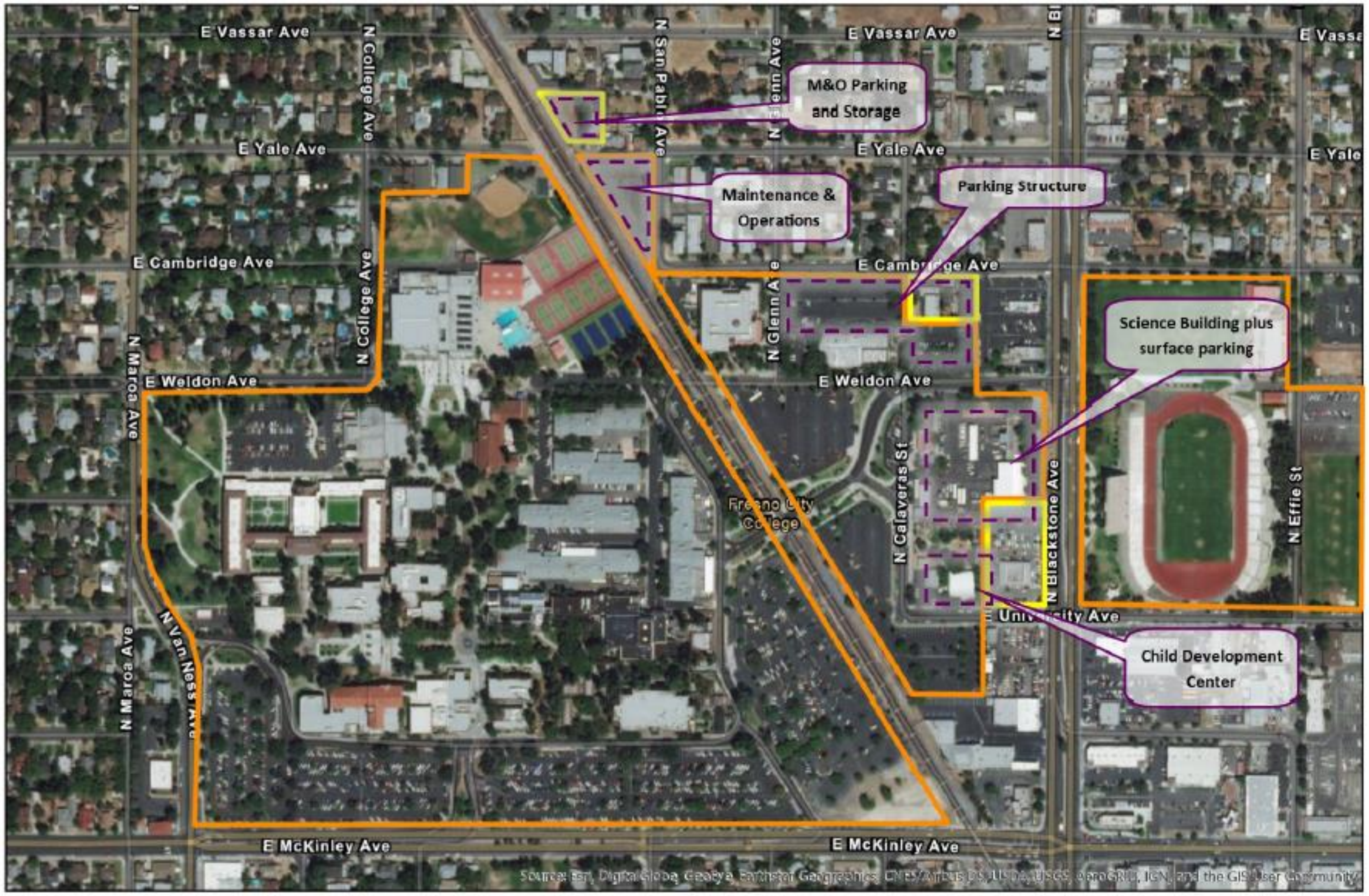
Energy use is typically associated with transportation, construction, and the operation of land uses. Transportation energy use is generally categorized by direct and indirect energy. Direct energy relates to energy consumption by vehicle propulsion. Indirect energy relates to the long-term indirect energy consumption of equipment, such as maintenance activities. Energy is also consumed by construction and routine operation and maintenance of land use. Construction energy relates to a direct one-time energy expenditure primarily associated with the consumption of fuel use to operate construction equipment. Energy-related to land use is normally associated with direct energy consumption for heating, ventilation, and air conditioning of buildings.

Figure 1. Project Location



Source: OPR 2019

Figure 2. Project Site Boundaries and Proposed Facilities



Project Site **Figure 2**

Fresno City College Parking and Facilities Expansion Project
State Center Community College District

ODELL Planning & Research, Inc.

Environmental Planning • School Facility Planning • Demographics

Existing Campus
Expansion Areas
Proposed Facilities Locations

0 125 250 500 Feet

N

Source: OPR 2019

EXISTING SETTING

PHYSICAL SETTING

The project is located in the City of Fresno. The City is served primarily by Pacific Gas & Electric (PG&E). The climate in the project area is semi-arid, with an annual normal precipitation of approximately 11 inches. Temperatures in the project area range from an average minimum of approximately 38 degrees Fahrenheit (°F), in January, to an average maximum of 98°F, in July (WRCC 2018).

State Center Community College District is dedicated to the responsible management of natural resources to continue efficient operations on campus. Electricity, natural gas, water, and other resources are managed using sustainability as a driving force in campus planning and operations. In 2018, the District embarked on solar installation projects at Fresno City College, Reedley College, Clovis Community College, and Madera Community College Center. The installed systems provide approximately 11,668,000 kilowatt hours (kWh). The systems are designed to produce a maximum of 83 percent of the campuses' energy needs (SCCCD 2018).

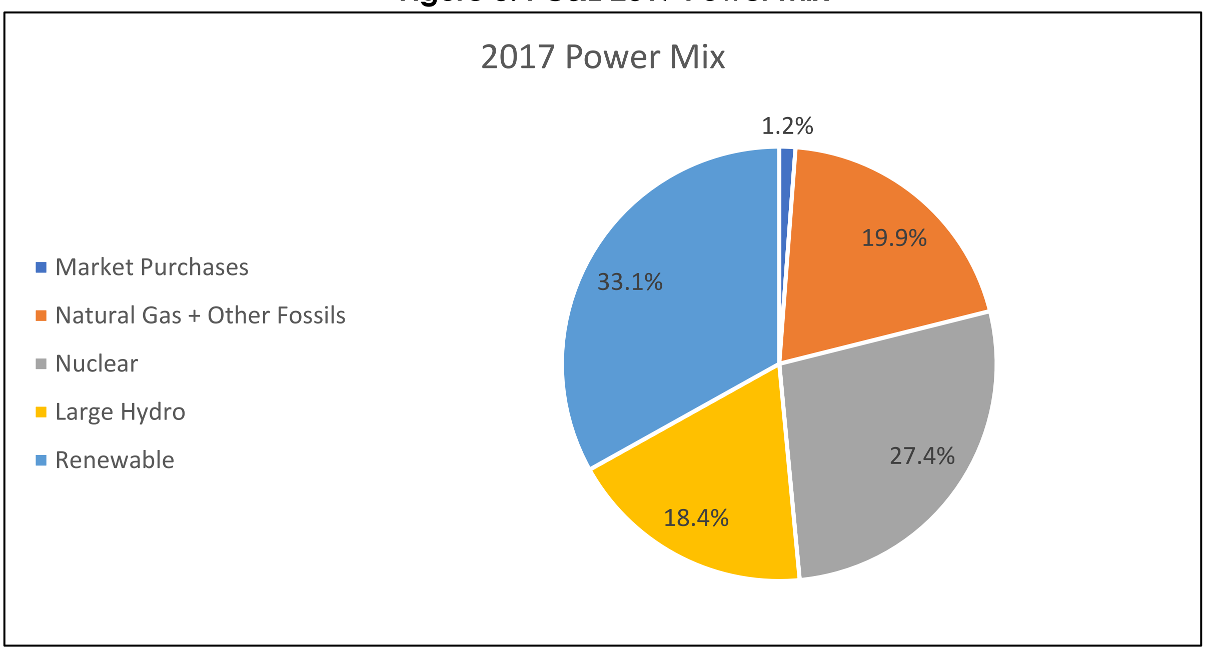
ENERGY RESOURCES

Energy sources for the City of Fresno are served primarily by Pacific Gas & Electric (PG&E). Energy resources consist largely of natural gas, nuclear, fossil fuels, hydropower, solar, and wind. The primary use of energy sources is for electricity to operate campus facilities.

ELECTRICITY

Electric services at Fresno City College are purchased from regulated electric utility, Pacific Gas and Electric Company (PG&E). The breakdown of PG&E's power mix is shown in Figure 3. As shown, roughly 78.8 percent of PG&E's 2018 total electric power mix came from greenhouse gas (GHG)-free sources that include nuclear, large hydro and renewable energy sources (PG&E 2018).

Figure 3. PG&E 2017 Power Mix



Source: PG&E 2019

NATURAL GAS

PG&E's natural gas system encompasses approximately 70,000 square miles in Northern and Central California. Approximately 90 percent of the natural gas supply for PG&E is from out-of-state imports. In 2017, natural gas throughput provided by PG&E totaled 800,923 million cubic feet (MMcf). Natural gas throughput has decreased over by past few years. In comparison to year 2015 throughput, natural gas throughput has decreased by 103,599 MMcf, an approximate 11.5 percent reduction (PG&E 2019).

REGULATORY FRAMEWORK

FEDERAL

REGULATIONS FOR GREENHOUSE GAS EMISSIONS FROM PASSENGER CARS AND TRUCKS AND CORPORATE AVERAGE FUEL ECONOMY STANDARDS

In October 2012, the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond. NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of carbon dioxide (CO2) per mile for the fleet of cars and light-duty trucks by the model year 2025.

In January 2017, EPA Administrator Gina McCarthy signed a Final Determination to maintain the current GHG emissions standards for the model year 2022-2025 vehicles. However, on March 15, 2017, EPA Administrator Scott Pruitt and Department of Transportation Secretary Elaine Chao announced that EPA intends to reconsider the Final Determination. On April 2, 2018, EPA Administrator Scott Pruitt officially withdrew the January 2017 Final Determination, citing information that suggests that these current standards may be too stringent due to changes in key assumptions since the January 2017 Determination. According to the EPA, these key assumptions include gasoline prices and overly optimistic consumer acceptance of advanced technology vehicles. The April 2nd notice is not EPA's final agency action. The EPA intends to initiate rulemaking to adopt new standards. Until that rulemaking has been completed, the current standards remain in effect. (EPA 2017, EPA 2018).

ENERGY POLICY AND CONSERVATION ACT

The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the National Highway Traffic and Safety Administration, which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and for revising existing standards. Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon (mpg). Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not currently subject to fuel economy standards. Compliance with federal fuel economy standards is determined based on each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The CAFE program, administered by EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the USDOT is authorized to assess penalties for noncompliance.

ENERGY POLICY ACT OF 1992

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

ENERGY POLICY ACT OF 2005

The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

STATE

WARREN-ALQUIST ACT

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The Act established a state policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The California Public Utilities Commission (CPUC) regulates privately-owned utilities in the energy, rail, telecommunications, and water fields.

ASSEMBLY BILL 2076: REDUCING DEPENDENCE ON PETROLEUM

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), CEC and the California Air Resources Board (CARB) prepared and adopted a joint agency report in 2003, *Reducing California's Petroleum Dependence*. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita vehicle miles traveled (VMT) (CEC and CARB 2003). Further, in response to the CEC's 2003 and 2005 *Integrated Energy Policy Reports*, Governor Davis directed CEC to take the lead in developing a long-term plan to increase alternative fuel use. A performance-based goal of AB 2076 was to reduce petroleum demand to 15 percent below 2003 demand by 2020.

SENATE BILL 1078: CALIFORNIA RENEWABLES PORTFOLIO STANDARD PROGRAM

Senate Bill 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. Executive Order S-14-08 was later superseded by Executive Order S-21-09 on September 15, 2009. Executive Order S-21-09 directed the ARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. Statute SB X1-2 superseded this Executive Order in 2011, which obligated all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020.

SENATE BILL 350: CLEAN ENERGY AND POLLUTION REDUCTION ACT OF 2015

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources to be increased to 50 percent by December 31, 2030. This act also requires doubling of the energy efficiency savings in electricity and natural gas for retail customers through energy efficiency and conservation by December 31, 2030.

ENERGY ACTION PLAN

The first Energy Action Plan (EAP) emerged in 2003 from a crisis atmosphere in California's energy markets. The State's three major energy policy agencies (CEC, CPUC, and the Consumer Power and Conservation Financing Authority [established under deregulation and now defunct]) came together to develop one high-level, coherent approach to meeting California's electricity and natural gas needs. It was the first time that energy policy agencies formally collaborated to define a common vision and set of strategies to address California's future energy needs and emphasize the importance of the impacts of energy policy on the California environment.

In the October 2005 *Energy Action Plan II*, CEC and CPUC updated their energy policy vision by adding some important dimensions to the policy areas included in the original EAP, such as the emerging importance of climate change, transportation-related energy issues, and research and development activities. The CEC recently adopted an update to the EAP II in February 2008 that supplements the earlier EAPs and examines the State's ongoing actions in the context of global climate change.

ASSEMBLY BILL 1007: STATE ALTERNATIVE FUELS PLAN

AB 1007 (Chapter 371, Statues of 2005) required CEC to prepare a state plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels Plan (SAF Plan) in partnership with CARB and in consultation with other state, federal, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes the costs to California and maximizes the economic benefits of in-state production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuel use, reduce greenhouse gas (GHG) emissions, and increase in-state production of biofuels without causing significant degradation of public health and environmental quality.

EXECUTIVE ORDER S-06-06

Executive Order (EO) S-06-06, signed on April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The Executive Order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The Executive Order also calls for the State to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 plan and provides a more detailed action plan to achieve the following goals:

- increase environmentally- and economically-sustainable energy production from organic waste;
- encourage the development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications;
- create jobs and stimulate economic development, especially in rural regions of the state; and
- reduce fire danger, improve air and water quality, and reduce waste.

As of 2016, 2.7 percent of the total electrical system power in California was derived from biomass (CEC 2017).

CALIFORNIA BUILDING CODE

The California Building Code (CBC) contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Code is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

Green Building Standards

In essence, green buildings standards are indistinguishable from any other building standards, are contained in the California Building Code, and regulate the construction of new buildings and improvements. Whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

The green buildings standards were most recently updated in May 2018. Referred to as the *2019 Building Energy Efficiency Standards*, these most recent updates focus on four key areas: smart residential photovoltaic systems, updated thermal envelope standards (preventing heat transfer from the interior to the exterior and vice versa), residential and nonresidential ventilation requirements, and non-residential lighting requirements. Under the newly adopted standards, nonresidential buildings will use about 30 percent less energy due mainly to lighting upgrades (CEC 2018).

Assembly Bill 32, Climate Change Scoping Plan and Update

In October 2008, ARB published its *Climate Change Proposed Scoping Plan*, which is the State's plan to achieve GHG reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementing the Low Carbon Fuel Standard program, implementation of energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems, and developing a renewable portfolio standard for electricity production.

The initial Scoping Plan was first approved by ARB on December 11, 2008, and is updated every five years. The first update of the Scoping Plan was approved by the ARB on May 22, 2014, which looked past 2020 to set mid-term goals (2030-2035) on the road to reach the 2050 goals. The most recent update released by ARB is the *2017 Climate Change Scoping Plan*, which was released in November 2017. The measures identified in the *2017 Climate Change Scoping Plan* have the co-benefit of increasing energy efficiency and reducing California's dependency on fossil fuels.

Senate Bill 375

SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that MPOs regional transportation plan. ARB, in consultation with MPOs, establishes regional reduction targets for GHGs emitted by passenger cars and light trucks for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, funding for transportation projects may be withheld.

Executive Order B-48-18: Zero Emission Vehicles

In January 2018, Governor Brown signed Executive Order B-48-18 which required all State entities to work with the private sector to put at least 5-million zero-emission vehicles on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 zero-emissions chargers by 2025. In addition, State entities are also required to continue to partner with local and regional governments to streamline the installation of zero-emission vehicle infrastructure. Additionally, all State entities are to support and recommend policies and actions to expand infrastructure in homes, through the Low-Carbon Fuel Standard.

Senate Bill 32 and Assembly Bill 197 of 2016

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG-reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs the ARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target. Achievement of these goals will have the co-benefit of increasing energy efficiency and reducing California's dependency on fossil fuels.

Advanced Clean Cars Program

In January 2012, CARB approved the Advanced Clean Cars program which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of standards for vehicle model years 2017 through 2025. The new rules strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires a battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the state. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions than the statewide fleet in 2016 (CARB 2016).

IMPACT ANALYSIS

Thresholds of Significance

Based on Appendix F and G of the State CEQA Guidelines, the proposed project would result in a potentially significant impact on energy use if it would:

1. Result in the wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation; or
2. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The CEQA Guidelines, Appendix F, requires environmental analyses to include a discussion of potential energy impacts associated with a proposed project. Where necessary, CEQA requires that mitigation measures be incorporated to reduce the inefficient, wasteful or unnecessary consumption of energy. The State CEQA Guidelines, however, do not establish criteria that define inefficient, wasteful or unnecessary consumption. Compliance with the State's building standards for energy efficiency would result in decreased energy consumption for proposed buildings. However, compliance with building codes may not adequately address all potential energy impacts associated with project construction and operation. As a result, this analysis includes an evaluation of electricity and natural gas usage requirements associated with future development, as well as, energy requirements associated with the use of on-road and off-road vehicles. The degree to which the proposed project would comply with existing energy standards, as well as, applicable regulatory requirements and policies related to energy conservation was also taken into consideration for the evaluation of project-related energy impacts.

Methodology

Construction

Regarding energy use (e.g., fuel use) during construction, it is assumed that only diesel fuel would be used in construction equipment. On-road vehicles for hauling materials and worker commute trips assumed a mix of diesel and gasoline fuel use. Construction schedules, equipment numbers, horsepower ratings, and load factors were used to calculate construction-related fuel use, based on default assumptions contained in the

California Emissions Estimator Model (CalEEMod). Diesel fuel use was estimated based on a factor of 0.05 gallons of diesel fuel per horsepower-hour derived from the South Coast Air Quality Management District's (SCAQMD) *CEQA Air Quality Handbook* (SCAQMD 1993).

OPERATIONS

The long-term operation of proposed the land uses would require electricity and natural gas usage for lighting, space and water heating, appliances, lab equipment, water conveyance, and landscaping maintenance equipment. Indirect energy use would include wastewater treatment and solid waste removal. Project operation would include the consumption of diesel and gasoline fuel from on-road vehicles.

Building energy use was estimated using CalEEMod, version 2016.3.2. Energy use included electricity and natural gas use, including electricity associated with the use, conveyance, and treatment of water. To be conservative, estimated energy use was based on year 2020 operational conditions. With continued improvements in building energy efficiencies, energy use in future years would be less.

Transportation fuel-use estimates were calculated by applying average fuel usage rates per vehicle mile to vehicle miles traveled (VMT) data associated with the proposed project. Annual VMT was estimated using CalEEMod, version 2016.3.2. Total VMT for the proposed land uses was adjusted to account for existing vehicle trips that would be relocated to the proposed land uses with project implementation. Average fuel usage rates by vehicle class, fuel type (e.g., diesel, gasoline, electric, and natural gas), and calendar year were obtained from Fresno County's emissions inventory derived from ARB's Emissions Factors (EMFAC) 2017 version 1.0.2 (ARB 2017b).

PROJECT IMPACTS AND MITIGATION MEASURES

Impact E-1:	***Would the project result in the wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?***

Implementation of the proposed project would increase electricity, diesel, gasoline, and natural gas consumption associated with construction activities, as well as long-term operational activities. Energy consumption associated with short-term construction and long-term operational activities are discussed in greater detail, as follows:

Construction-Related Energy Consumption

Energy consumption would occur during construction of the proposed facilities, including fuel use associated with the on-site operation of off-road equipment and vehicles traveling to and from the construction site. Table 1 summarizes the levels of energy consumption associated with project construction. As depicted, operation of off-road construction equipment would use an estimated total of 46,670 gallons of diesel fuel. On-road vehicles would use approximately 19,743 gallons of gasoline and 6,953 gallons of diesel fuel. In total, fuel use would equate to approximately 9,744 million British thermal units per year (MMBU) over the life of the construction project. Construction equipment use and associated energy consumption would be typical of that commonly associated with the construction of new land uses. As a result, project construction would not be anticipated to require the use of construction equipment that would be less energy efficient than those commonly used for the construction of similar facilities. Idling of on-site equipment during construction would be limited to no more than five minutes in accordance with San Joaquin Valley Air Pollution Control District (SJVAPCD) requirements. Furthermore, on-site construction equipment may include alternatively-fueled vehicles (e.g., natural gas) where feasible. Energy use associated with construction of the proposed facilities would be temporary and would not be anticipated to result in the need for additional capacity, nor would construction be anticipated to result in increased peak-period demands for electricity. As a result, the construction of proposed facilities and improvements would not result in an inefficient, wasteful, or unnecessary consumption of energy. As a result, impacts are considered **less than significant**.

Table 1. Construction Energy Consumption

Source	Total Fuel Use (gallons)	Total MMBTU
Off-Road Equipment Use (Diesel)	46,670	6,412
On-Road Vehicles (Gasoline)	19,743	2,378
On-Road Vehicles (Diesel)	6,953	955
	Total:	9,744

Fuel use was calculated based, in part, on default construction schedules, equipment use, and vehicle trips identified for the construction of similar land uses contained in the CalEEMod output files prepared for the air quality analysis conducted for this project. Refer to Appendix A for modeling assumptions and results.

Operational Mobile-Source Energy Consumption

Operational mobile-source energy consumption would be primarily associated with commute trips to and from the campus. Energy use associated with commute trips are discussed in greater detail, as follows:

Table 2 summarizes the total fuel use at build-out of the proposed land uses. As noted in Table 2, the proposed land uses would consume an estimated 701 gallons/year of diesel fuel and an estimated 135,093 gallons/year of gasoline. However, a large majority of the estimated fuel use (roughly 90 percent) would be associated with existing vehicle trips, which would be relocated with project implementation. As a result, the proposed project would not result in increased fuel usage that would be considered unnecessary, inefficient, or wasteful. This impact would be considered less-than-significant.

Table 2. Operational Fuel Consumption

Source	Total Fuel Use (gallons)	Total MMBTU
Proposed Land Uses		
On-Road Vehicles (Diesel)	701	96
On-Road Vehicles (Gasoline)	135,093	16,269
Existing Vehicle Trips to be Relocated		
On-Road Vehicles (Diesel)	636	87
On-Road Vehicles (Gasoline)	122,632	14,768
	Net Increase:	1,510

Fuel use was calculated based, in part, on VMT data for the proposed land uses derived from CalEEMod. Refer to Appendix A for modeling assumptions and results.

Operational Building-Use Energy Consumption

The proposed project would result in increased electricity and natural gas consumption associated with the long-term operation of the proposed land uses. It is important to note that the proposed buildings would be required to comply with Title 24 standards for energy-efficiency, which would include increased building insulation and energy-efficiency requirements, including the use of energy-efficient lighting, energy-efficient appliances, and use of low-flow water fixtures.

Estimated electricity and natural gas consumption associated with proposed facilities to be constructed as part of the proposed project are summarized in Table 3. As depicted, new facilities at build-out would result in the consumption of approximately 1,886,154 kilowatt hours per year (kWh/Yr) of electricity and approximately 622,513 kilo British thermal units per year (kBTU/Yr) of natural gas. In total, the proposed facilities would use consume a total of approximately 7,058 MMBTU/year. The proposed project would comply with the most current building energy-efficient standards (i.e., Title 24), which would result in increased building energy efficiency and energy conservation. However, detailed project-specific information regarding future on-site energy-conservation measures have not yet been identified. For this reason, implementation of the proposed project could result in wasteful, inefficient, and unnecessary consumption of energy. As a result, this impact would be considered **potentially significant**.

Table 3. Operational Electricity & Natural Gas Consumption

Source	Energy Use	MMBTU/Year
Electricity Consumption	1,852,122 kWh/year	6,319
Water Use, Treatment & Conveyance	34,032 kWh/Year	116
Natural Gas Use	622,513 kBTU/Year	623
	Total:	7,058
Fuel use was calculated based, in part, on default construction schedules, equipment use, and vehicle trips identified for the construction of similar land uses contained in the CalEEMod output files prepared for the air quality analysis conducted for this project. Refer to Appendix A for modeling assumptions and results.		

Mitigation Measures

E-1: The following measures shall be implemented to reduce or offset energy use associated with the development of future land uses. These measures shall be shown on grading and building plans:

- Meet or exceed Cal Green Tier 2 standards for providing EV charging infrastructure.
- Meet or exceed Cal Green Tier 2 standards for using shading, trees, plants, cool roofs, etc. to reduce the "heat island" effect.
- New buildings shall be designed to achieve a minimum 5-percent improvement beyond 2016 Title 24 building energy-efficiency standards with a goal of achieving net-zero energy use.
- Utilize high efficiency lights in parking lots, streets, and other public areas.
- Incorporate measures and building design features that reduce energy use, water use, and waste generation (e.g., light-colored roofing materials, installation of automatic lighting controls, planting of trees to provide shade).
- Install energy-efficient appliances and building components sufficient to achieve overall reductions in interior energy use beyond those required at the time of development by CalGreen standards.
- New buildings and parking structures shall be designed to accommodate rooftop solar photovoltaic systems.
- Plant drought tolerate landscaping and incorporate water-efficient irrigation systems where necessary.
- Plant drought-tolerant, native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.

Significance After Mitigation

Mitigation Measure E-1 includes measures that would result in decreased energy consumption and increase reliance on renewable energy sources. With the implementation of Mitigation Measures E-1, implementation of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy. This impact would be considered **less than significant**.

Impact 2:	***Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?***

As discussed earlier in this report, the proposed land uses would consume an estimated 701 gallons/year of diesel fuel and an estimated 135,093 gallons/year of gasoline. However, a large majority of the estimated fuel use (roughly 90 percent) would be associated with existing vehicle trips, which would be relocated with project implementation. As a result, the proposed project would not result in increased fuel usage that would be anticipated to conflict with applicable plans, policies, or regulations adopted for the purpose of reducing future fuel consumption rates.

The State of California's Energy Efficiency Strategic Plan establishes a goal for the development of building with net zero energy consumption. This plan includes goals pertaining to the construction of new residential, commercial, and governmental buildings. Adherence to current and future Title 24 energy requirements would help to reduce the project's building-use energy consumption. Additional measures would, nonetheless, likely be required to achieve a goal of meeting net-zero energy usage. However, the specific measures to be implemented have not yet been clearly defined. For these reasons, this impact would be considered **potentially significant.**

Mitigation Measures

Implement Mitigation Measure E-1

Significance After Mitigation

Mitigation measures have been included to reduce overall operational energy consumption, including those associated with long-term operational building energy use. With mitigation, operational energy consumption would be substantially reduced, beyond those required by Title 24 building energy-efficiency requirements. With mitigation, this impact would be considered **less than significant**

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APPENDIX A

Energy Modeling

Energy Use Summary

Construction Energy Use

	Gallons	Annual MMBTU
Off-Road Equipment Fuel (Diesel)	46,670	6,411.54
On-Road Vehicle Fuel (Gasoline)	19,743	2,377.58
On-Road Vehicle Fuel (Diesel)	6,953	955.27
	Total:	9,744.38

Operational Fuel Use

	Gallons	Annual MMBTU
Mobile Fuel (Diesel)	701	96.29
Mobile Fuel (Gasoline)	135,093	16,269.07
Less Existing Trips to be Relocated:		
Mobile Fuel (Diesel)	-636	-87.41
Mobile Fuel (Gasoline)	-122,632	-14,768.40
	Total:	1,509.55

Operational Electricity & Natural Gas Use

	Annual Energy	Annual MMBTU
Electricity (kWh/yr, MMBTU)	1,852,122	6,319.44
Water Use, Treatment & Conveyance (kWh/Yr, MMBTU)	34,032	116
Natural Gas (kBTU/yr, MMBTU)	622,513	623

Construction Equipment Fuel Use

OFF-ROAD EQUIPMENT FUEL USE

Primary Construction Activity	Activity Duration (Days)	Equipment Type	Size (hp)	Number of Pieces	Hours of Daily Use/Piece of Equipment	Total Days of Use	Load Factor	Fuel Usage Rate (g/bhph)	Total Fuel Diesel (Gallons)
Demolition	5	Excavators	158	3	8	5	0.38	0.05	360
		Concrete Saws	81	1	8	5	0.73	0.05	118
		Rubber Tired Dozer	247	2	8	5	0.40	0.05	395
Site Preparation	10	Tractor/Loader/Backhoe	97	4	8	10	0.37	0.05	574
		Rubber Tired Dozer	247	3	8	10	0.40	0.05	1186
Grading	30	Excavators	158	2	8	30	0.38	0.05	1441
		Rubber Tired Dozer	247	1	8	30	0.40	0.05	1186
		Grader	187	1	8	30	0.41	0.05	920
		Tractor/Loader/Backhoe	97	2	8	30	0.37	0.05	861
		Scraper	367	2	8	30	0.48	0.05	4228
Building Construction	275	Cranes	231	1	7	275	0.29	0.05	6448
		Forklifts	89	3	8	275	0.20	0.05	5874
		Generators	84	1	8	275	0.74	0.05	6838
		Tractor/Loader/Backhoe	97	3	8	275	0.37	0.05	11844
		Welders	46	1	8	275	0.45	0.05	2277
Paving	20	Paver	130	2	8	20	0.42	0.05	874
		Roller	80	2	8	20	0.38	0.05	486
		Paving Equipment	132	2	8	20	0.36	0.05	760
Arch. Coating	20	Air Compressors	78	1	6	20	0.48	0.05	225

Equipment usage assumptions based on information provided by the project applicant and default assumptions contained in CalEEMod.

Total Diesel Fuel Use (Gallons):	46670
Number of Construction Years:	5
Average Diesel Fuel Use/Year:	9334
BTU/Gallon:	137381
MMBTU:	6412

Construction Fuel Use - On-Road Vehicles

Activity	Demo	Site Prep	Grading	Bldg	Pav	Arch	Total	LDA	LDT1	LDT2	MDV	HDV
Days	20	10	30	275	20	20						
Worker Trips	15	18	20	219	15	44						
Miles/Trip	10.8	10.8	10.8	10.8	10.8	10.8						
Total VMT	3240	1944	6480	650430	3240	9504	674838	224946	224946	224946	0	0
Vendor Trips	0	0	0	85	0	0						
Miles/Trip	7.3	7.3	7.3	7.3	7.3	7.3						
Total VMT	0	0	0	170637.5	0	0	170637.5	0	0	0	170637.5	0
Haul Trips	197	0	0	0	0	0						
Miles/Trip	**20**	0	0	0	0	0						
Total VMT	3940	0	0	0	0	0	3940	0	0	0	0	3940

	Annual VMT	Gallons/Mile*	Gallons	BTU/gallon**	BTU	MMBTU
HDT	3940	0.12622179	497	137381	68321475	68.32
LDA	224946	0.02027207	4560	120429	549170906	549.17
LDT1	224946	0.03979754	8952	120429	1078116246	1078.12
LDT2	224946	0.02769632	6230	120429	750293897	750.29
MDV	170638	0.03783512	6456	137381	886944189	886.94

**Gallons per mile based on year 2020 conditions for Fresno County. Derived from Emfac2017 (v1.0.2) Emissions Inventory.*

***Energy coefficient derived from US EIA.*

https://www.eia.gov/energyexplained/index.php?page=about_energy_units

EMFAC2017 Fuel Rate Calculation	Fuel Consumption (1000 Gallons/Day)*		VMT (Miles/Day)**		
	Diesel	Gasoline	Diesel	Gasoline	TOTAL
All Other Buses	1.035087109	4.059355022	9067.159499	18709.87342	
LDA	2.064454585	451.520014	101837.3682	13494046.7	
LDT1	0.018547146	52.55881216	466.037494	1331217.898	
LDT2	0.572855768	203.2515112	20683.46194	4681993.762	
MDV	3.101507646	226.9135402	81974.29992	4262160.146	
T6 instate construction heavy	4.277772946		33890.92234		
Total	3.690944609	711.3896923	132054.0271	19525968.23	19658022.26
LDA-Miles/Gallon	49.32894573	29.88582185			
LDA-Gallons/Mile	0.020272073	0.033460683			
LDT1-Miles/Gallon	25.1271808	25.32815799			
LDT1-Gallons/Mile	0.039797541	0.03948175			
LDT2-Miles/Gallon	36.10588055	23.0354684			
LDT2-Gallons/Mile	0.027696319	0.043411316			
MDV-Miles/Gallon	26.43046843	18.78319003			
MDV-Gallons/Mile	0.037835122	0.053239093			
HDT-Miles/Gallon	7.922562223	0			
HDT-Gallons/Mile	0.126221792	0			

**Fuel consumptions derived from EMFAC2017 (v1.0.2) for year 2020 conditons.*

***VMT derived from EMFAC2017 (v1.0.2) for year 2020 conditons.*

Fuel consumption and VMT based on the Fresno County.

Operational Fuel Use - Proposed Project (Includes Existing Trips to be Relocated)

LAND USE	Total Annual VMT
Fresno City College Expansion	3,733,050

	VMT	Gallons/Mile*	Gallons	BTU/gallon**	BTU	MMBTU
Diesel	25077	0.02795026	701	137381	96291552	96.29
Gasoline	3707973	0.03643300	135093	120429	16269066439	16269.07

**Gallons per mile based on year 2020 conditions for Fresno County. Derived from Emfac2017 (v1.0.2) Emissions Inventory.*

**Energy coefficient derived from US EIA.

https://www.eia.gov/energyexplained/index.php?page=about_energy_units

EMFAC2017 Fuel Rate Calculation	Fuel Consumption (1000 Gallons/Day)*		VMT (Miles/Day)**		
	Diesel	Gasoline	Diesel	Gasoline	
All Other Buses	1.035087109	4.059355022	9067.159499	18709.87342	
LDA	2.064454585	451.520014	101837.3682	13494046.7	
LDT1	0.018547146	52.55881216	466.037494	1331217.898	
LDT2	0.572855768	203.2515112	20683.46194	4681993.762	
LHD1	21.79765028	44.6408661	382134.3592	367003.075	
LHD2	8.350491501	8.684127765	130432.0739	62158.88221	
MCY		3.990727039		150977.0295	
MDV	3.101507646	226.9135402	81974.29992	4262160.146	
MH	0.661775292	3.342716053	6352.205322	15632.70507	
Motor Coach	1.239135957		7621.885979		
PTO	2.975331043		14402.73947		
SBUS	4.44703586	0.538425642	35143.85454	4865.278368	
T6 Ag	0.120575138		1092.863353		
T6 CAIRP heavy	2.673218584	11.11684725	28844.52565	51820.80268	
T6 CAIRP small	0.394522623		4015.605218		
T6 instate construction heavy	4.277772946		33890.92234		
T6 instate construction small	13.74525557		109477.4062		
T6 instate heavy	25.69059637		244545.1136		
T6 instate small	21.57257248		198893.1813		
T6 OOS heavy	1.53043116		16521.01454		
T6 OOS small	0.229057734		2330.505268		
T6 Public	1.182932642		8156.331563		
T6 utility	0.212587659		1837.683515		
T7 Ag	0.151227179	0.118056141	867.0599856	457.2598871	
T7 CAIRP	70.33496316		462378.7093		
T7 CAIRP construction	4.30480009		24344.14392		
T7 NNOOS	83.28774964		563669.9618		
T7 NOOS	28.27506353		181665.3166		
T7 other port	1.543748104		8303.834768		
T7 POAK	5.976211186		30839.48615		
T7 POLA	6.146541723		31576.31877		
T7 Public	2.758996532		14804.31096		
T7 Single	11.9221223		72535.07482		
T7 single construction	11.55096684		60393.34344		
T7 SWCV	7.456095929		17884.08625		
T7 tractor	95.01953481		670072.7923		
T7 tractor construction	9.571636773		49819.19125		
T7 utility	0.127626528		715.9644261		
UBUS	0.208894076	1.498711856	1677.499239	6668.753156	
Total	3.690944609	711.3896923	132054.0271	19525968.23	19658022.26
Percent of Total			0.67%	99.33%	
Miles/Gallon	35.7778404	27.44764008			
Gallons/Mile	0.027950262	0.036433005			

*Fuel consumptions derived from EMFAC2017 (v1.0.2) for year 2020 conditons.

**VMT derived from EMFAC2017 (v1.0.2) for year 2020 conditons.

Fuel consumption and VMT based on the Fresno County.

Operational Fuel Use - Proposed Project (Existing Trips to be Relocated)

LAND USE	Total Annual VMT
Fresno City College Expansion	3,388,712

	VMT	Gallons/Mile*	Gallons	BTU/gallon**	BTU	MMBTU
Diesel	22764	0.02795026	636	137381	87409581	87.41
Gasoline	3365948	0.03643300	122632	120429	14768401353	14768.40

**Gallons per mile based on year 2020 conditions for Fresno County. Derived from Emfac2017 (v1.0.2) Emissions Inventory.*

**Energy coefficient derived from US EIA.

https://www.eia.gov/energyexplained/index.php?page=about_energy_units

EMFAC2017 Fuel Rate Calculation	Fuel Consumption (1000 Gallons/Day)*		VMT (Miles/Day)**		
	Diesel	Gasoline	Diesel	Gasoline	
All Other Buses	1.035087109	4.059355022	9067.159499	18709.87342	
LDA	2.064454585	451.520014	101837.3682	13494046.7	
LDT1	0.018547146	52.55881216	466.037494	1331217.898	
LDT2	0.572855768	203.2515112	20683.46194	4681993.762	
LHD1	21.79765028	44.6408661	382134.3592	367003.075	
LHD2	8.350491501	8.684127765	130432.0739	62158.88221	
MCY		3.990727039		150977.0295	
MDV	3.101507646	226.9135402	81974.29992	4262160.146	
MH	0.661775292	3.342716053	6352.205322	15632.70507	
Motor Coach	1.239135957		7621.885979		
PTO	2.975331043		14402.73947		
SBUS	4.44703586	0.538425642	35143.85454	4865.278368	
T6 Ag	0.120575138		1092.863353		
T6 CAIRP heavy	2.673218584	11.11684725	28844.52565	51820.80268	
T6 CAIRP small	0.394522623		4015.605218		
T6 instate construction heavy	4.277772946		33890.92234		
T6 instate construction small	13.74525557		109477.4062		
T6 instate heavy	25.69059637		244545.1136		
T6 instate small	21.57257248		198893.1813		
T6 OOS heavy	1.53043116		16521.01454		
T6 OOS small	0.229057734		2330.505268		
T6 Public	1.182932642		8156.331563		
T6 utility	0.212587659		1837.683515		
T7 Ag	0.151227179	0.118056141	867.0599856	457.2598871	
T7 CAIRP	70.33496316		462378.7093		
T7 CAIRP construction	4.30480009		24344.14392		
T7 NNOOS	83.28774964		563669.9618		
T7 NOOS	28.27506353		181665.3166		
T7 other port	1.543748104		8303.834768		
T7 POAK	5.976211186		30839.48615		
T7 POLA	6.146541723		31576.31877		
T7 Public	2.758996532		14804.31096		
T7 Single	11.9221223		72535.07482		
T7 single construction	11.55096684		60393.34344		
T7 SWCV	7.456095929		17884.08625		
T7 tractor	95.01953481		670072.7923		
T7 tractor construction	9.571636773		49819.19125		
T7 utility	0.127626528		715.9644261		
UBUS	0.208894076	1.498711856	1677.499239	6668.753156	
Total	3.690944609	711.3896923	132054.0271	19525968.23	19658022.26
Percent of Total			0.67%	99.33%	
Miles/Gallon	35.7778404	27.44764008			
Gallons/Mile	0.027950262	0.036433005			

*Fuel consumptions derived from EMFAC2017 (v1.0.2) for year 2020 conditons.

**VMT derived from EMFAC2017 (v1.0.2) for year 2020 conditons.

Fuel consumption and VMT based on the Fresno County.

Water Energy Use

	WATER USE*	ELECTRIC INTENSITY FACTORS (kWh/Mgal)		ANNUAL ELECTRIC USE (kWh/Yr)		
	MGAL/YR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	TOTAL
ANNUAL INDOOR WATER USE	5.16	3500		18044		34,032
ANNUAL OUTDOOR WATER USE	4.57		3500		15988	

*Based on estimated water use derived from CalEEMod.
**Energy coefficient derived from US EIA.
https://www.eia.gov/energyexplained/index.php?page=about_energy_units

BTU/kWh**	3412
BTU:	116116246
MMBTU:	116.12

Operational Electricity & Natural Gas Use

	kWh/yr	MWh/Yr	BTU/kWh*	BTU	MMBTU
Electricity	1852122	1852	3412	6319440264	6319.44

*Energy coefficient derived from US EIA.
https://www.eia.gov/energyexplained/index.php?page=about_energy_units

	kBTU/yr			BTU	MMBTU
Natural Gas	622513			622513000	622.51

*Energy coefficient derived from US EIA.
https://www.eia.gov/energyexplained/index.php?page=about_energy_units

APPENDIX 5

Noise & Groundborne Vibration Impact Analysis

NOISE & GROUNDBORNE VIBRATION IMPACT ANALYSIS

FOR

FRESNO CITY COLLEGE PARKING & FACILITIES EXPANSION PROJECT

STATE CENTER COMMUNITY COLLEGE DISTRICT FRESNO, CA

SEPTEMBER 2019

PREPARED FOR:

ODELL PLANNING & RESEARCH, INC.
49346 ROAD 426, SUITE 2
OAKHURST, CA 93644

PREPARED BY:

AMBIENT
AIR QUALITY & NOISE CONSULTING

612 12TH STREET, SUITE 201
PASO ROBLES, CA 93446

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LIST OF COMMON TERMS AND ACRONYMS

ANSI	Acoustical National Standards Institute, Inc.
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibels
dBA	A-Weighted Decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
HVAC	Heating Ventilation & Air Conditioning
in/sec	Inches per Second
L_{dn}	Day-Night Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
ppv	Peak Particle Velocity
U.S. EPA	United States Environmental Protection Agency

INTRODUCTION

This report discusses the existing setting, identifies potential noise impacts associated with implementation of the proposed project. Noise mitigation measures are recommended where the predicted noise levels would exceed applicable noise standards.

PROPOSED PROJECT SUMMARY

The proposed project includes expansion of various onsite parking and facilities at Fresno City College. The project location is depicted in Figures 1 and 2. The following facilities and activities are planned as part of the project. Development of the facilities would occur over the next five years.

- Construction of a parking structure on the south side of Cambridge Avenue west of Blackstone Avenue located north of the existing district office building. The proposed parking structure would have capacity for up to 1,000 parking spaces, include up to five levels of parking, and include ingress/egress points at Weldon Avenue and potentially Cambridge Avenue.
- Construction of a three-story Science Building (approximately 95,000 square feet) located near the southwest corner of Blackstone and Weldon Avenues. The new Science Building is proposed to include 6 biology labs, 3 anatomy and physiology labs, 5 chemistry labs, 2 physics labs, 2 engineering labs, a computer lab, 3 general educational classrooms, 4 Design Science (Middle College) classrooms, welcome center, tutorial space, and 34 faculty offices. Surface parking would also be added adjacent to the building. Existing Maintenance & Operations facilities located in this area would be removed and relocated to a different area of the campus (see below).
- Replacement of the existing one-story, 5,255 square-foot Child Development Center with a new one-story, 16,480 square-foot Child Development Center at its current location.
- Construction of a one-story, 10,000 square-foot Maintenance & Operations building plus a parking and storage area on the west side of San Pablo Avenue northwest of the existing Health Sciences Building.
- Repurposing of the existing District administration building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department.

EXISTING SETTING

CONCEPTS AND TERMINOLOGY

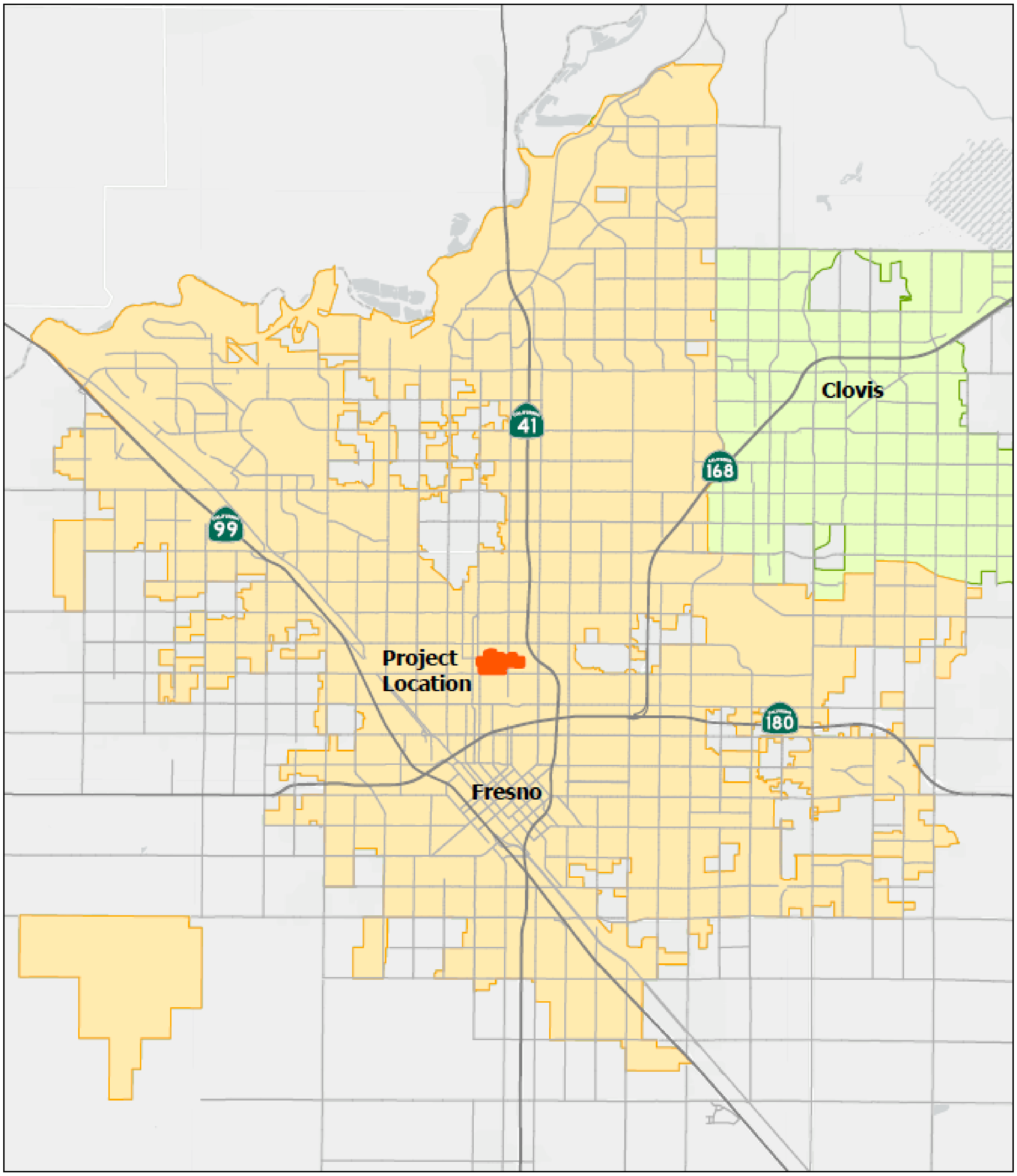
ACOUSTIC FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency.

Amplitude

Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3-dB change in amplitude as the minimum audible difference perceptible to the average person.

Figure 1
Project Location



Regional Location **Figure 1**

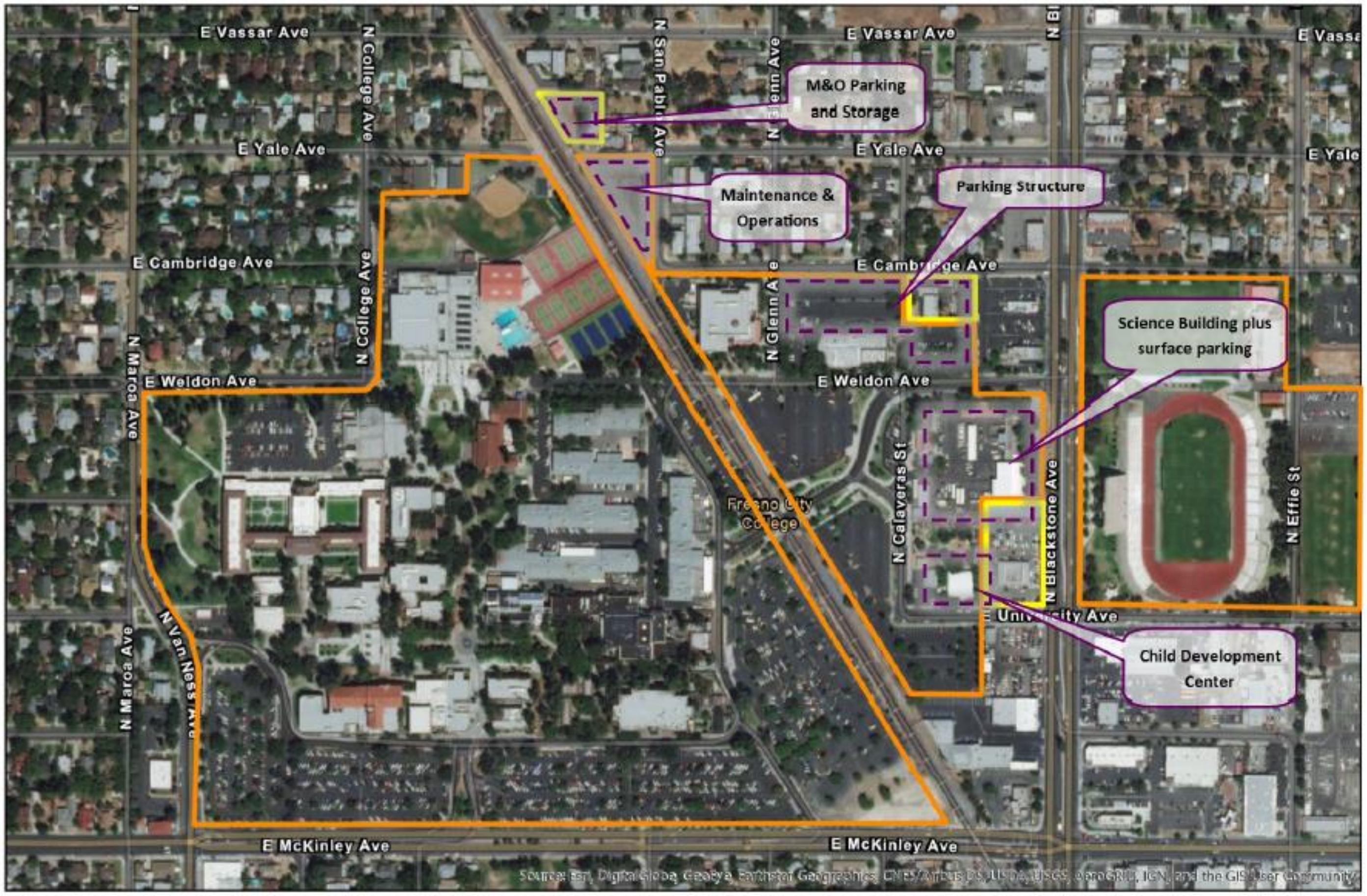
Fresno City College Parking and Facilities Expansion Project
State Center Community College District

ODELL Planning & Research, Inc.
Environmental Planning • School Facility Planning • Demographics

0 1 2 4 Miles N

Source: OPR 2019

Figure 2
Project Site Boundaries and Proposed Facilities



Project Site **Figure 2**

Fresno City College Parking and Facilities Expansion Project
State Center Community College District

ODELL Planning & Research, Inc.
Environmental Planning • School Facility Planning • Demographics

Existing Campus
Expansion Areas
Proposed Facilities Locations

0 125 250 500 Feet
N

Source: OPR 2019

Frequency

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA (U.S. EPA 1971). Common community noise sources and associated noise levels, in dBA, are depicted in Figure 3.

Addition of Decibels

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation & Attenuation

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level decreases (attenuates) at a rate of approximately 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 decibels for each doubling of distance from a line source, depending on ground surface characteristics. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water,), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation for soft surfaces results in an overall attenuation rate of 4.5 decibels per doubling of distance from the source.

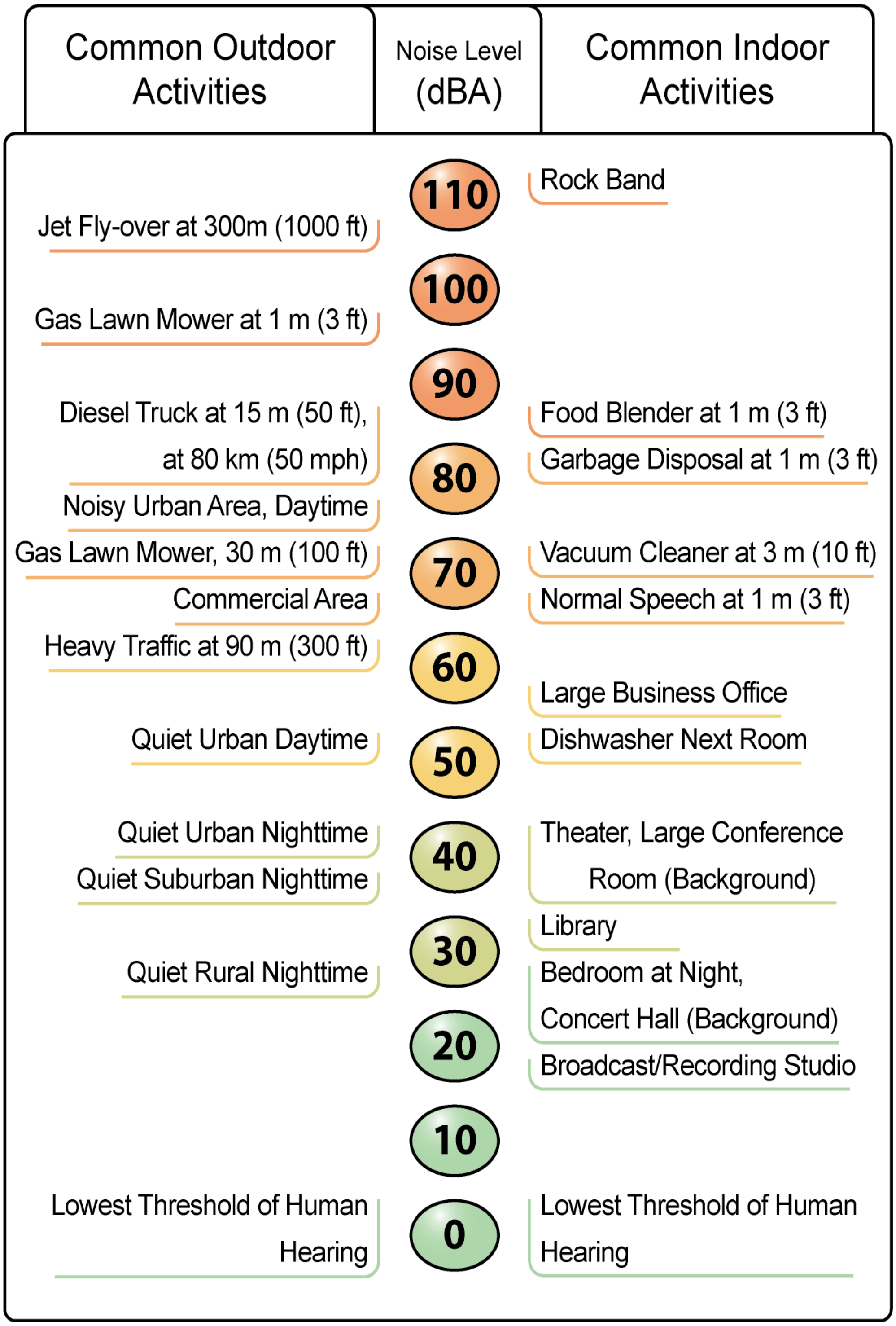
Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often

Figure 3
Common Community Noise Sources & Noise Levels



Source: Caltrans 2018

constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in minimum 5 dB of noise reduction. Taller barriers provide increased noise reduction.

Noise reductions afforded by building construction can vary depending on construction materials and techniques. Standard construction practices typically provide approximately 15 dBA exterior-to-interior noise reductions for building facades, with windows open, and approximately 20-30 dBA, with windows closed. With compliance with current Title 24 energy efficiency standards, which require increased building insulation and inclusion of an interior air ventilation system to allow windows on noise-impacted façades to remain closed, exterior-to-interior noise reductions typically average approximately 25 dBA. The absorptive characteristics of interior rooms, such as carpeted floors, draperies and furniture, can result in further reductions in interior noise.

NOISE DESCRIPTORS

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the sound-pressure level in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the "A-weighted" sound level (expressed in units of dBA). The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are typically used. For the evaluation of environmental noise, the most commonly used descriptors are L_{eq}, L_{dn}, CNEL and SEL. The energy-equivalent noise level, L_{eq}, is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level, L_{dn}, is the 24-hour average of the noise intensity, with a 10-dBA "penalty" added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn} but adds an additional 5-dBA penalty for evening noise (7 p.m. to 10 p.m.) Another descriptor that is commonly discussed is the single-event noise exposure level, also referred to as the sound-exposure level, expressed as SEL. The SEL describes a receiver's cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 second), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle. Common noise level descriptors are summarized in Table 1.

HUMAN RESPONSE TO NOISE

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Table 1
Common Acoustical Descriptors

Descriptor	Definition
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Minimum Noise Level (L_{min})	The minimum instantaneous noise level during a specific period of time.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The DNL was first recommended by the U.S. EPA in 1974 as a "simple, uniform and appropriate way" of measuring long term environmental noise. DNL takes into account both the frequency of occurrence and duration of all noise events during a 24-hour period with a 10 dBA "penalty" for noise events that occur between the more noise-sensitive hours of 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.
Sound Exposure Level (SEL)	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans;
- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial;
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on Human Activities

The extent to which environmental noise is deemed to result in increased levels of annoyance, activity interference, and sleep disruption varies greatly from individual to individual depending on various factors, including the loudness or suddenness of the noise, the information value of the noise (e.g., aircraft overflights, child crying, fire alarm), and an individual's sleep state and sleep habits. Over time, adaptation to noise events and increased levels of noise may also occur. In terms of land use compatibility, environmental noise is often evaluated in terms of the potential for noise events to result in increased levels of annoyance, sleep disruption, or interference with speech communication, activities, and learning. Noise-related effects on human activities are discussed in more detail, as follows:

Speech Communication

For most noise-sensitive land uses, an interior noise level of 45 dB L_{eq} is typically identified for the protection of speech communication in order to provide for 100-percent intelligibility of speech sounds. Assuming a minimum 20-dB reduction in sound level between outdoors and indoors, with windows closed, this interior noise level of 45 dB L_{eq} would equate to an exterior noise level of 65 dBA L_{eq}. For outdoor voice communication, an exterior noise level of 60 dBA L_{eq} allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility (U.S. EPA 1974.) Based on this information, speech interference begins to become a problem when steady noise levels reach approximately 60 to 65 dBA. Within interior noise environments, an average-hourly background noise level of 45 dBA L_{eq} is typically recommended for noise-sensitive land uses, such as educational facilities (Caltrans 2002).

Learning

Closely related to speech interference are the effects of noise on learning and, more broadly, on cognitive tasks. Recent studies have shown a strong relationship between noise and children's reading ability. Children's attention spans also appear to be adversely affected by noise. Adults are affected as well. Some studies indicate that, in a noisy environment, adults have increased difficulty accomplishing complex tasks. One of the issues associated with assessment of these effects is which noise metric correlates most closely with the impacts. For example, the average-daily noise level (i.e., CNEL/L_{dn}), which incorporates a nighttime weighting, may not be the best measure of noise impacts on schools given that operational activities are often limited to the daytime hours (Caltrans 2002).

Various standards and recommended criteria have been developed to specifically address classroom noise. For instance, with regard to transportation sources, the California Department of Transportation has adopted abatement criteria that limit the maximum interior average-hourly noise level within classrooms and other noise-sensitive interior uses, to 52 dBA L_{eq}. In June 2002, the American National Standards Institute, Inc. (ANSI) released a new classroom acoustics standard entitled Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools" (ANSI S12.60-2002). For schools exposed to intermittent background noise sources, such as airport and other transportation noise, the ANSI standards recommend that interior noise levels not exceed 40 dBA L_{eq} during the noisiest hour of the day. At present complying with the ANSI-recommended standard is voluntary in most locations.

Annoyance & Sleep Disruption

With regard to potential increases in annoyance, activity interference, and sleep disruption, land use compatibility determinations are typically based on the use of the cumulative noise exposure metrics (i.e., CNEL or L_{dn}). Perhaps the most comprehensive and widely accepted evaluation of the relationship between noise exposure and the extent of annoyance was one originally developed by Theodore J. Schultz in 1978. In 1978 the research findings of Theodore J. Schultz provided support for L_{dn} as the descriptor for environmental noise. Research conducted by Schultz identified a correlation between the cumulative noise exposure metric and individuals who were highly annoyed by transportation noise. The Schultz curve, expressing this correlation, became a basis for noise standards. When expressed graphically, this relationship is typically referred to as the Schultz curve. The Schultz curve indicates that approximately 13 percent of the population is highly annoyed at a noise level of 65 dBA L_{dn}. It also indicates that the percent of people describing themselves as being highly annoyed accelerates smoothly between 55 and 70 dBA L_{dn}. A noise level of 65 dBA L_{dn} is a commonly referenced dividing point between lower and higher rates of people describing themselves as being highly annoyed (Caltrans 2002).

The Schultz curve and associated research became the basis for many of the noise criteria subsequently established for federal, state, and local entities. Most federal and state of California regulations and policies related to transportation noise sources establish a noise level of 65 dBA CNEL/L_{dn} as the basic limit of acceptable noise exposure for residential and other noise-sensitive land uses. For instance, with respect to aircraft noise, both the Federal Aviation Administration (FAA) and the State of California have identified a noise level of 65 dBA L_{dn} as the dividing point between normally compatible and normally incompatible residential land use generally applied for determination of land use compatibility. For noise-sensitive land uses exposed to aircraft noise, noise levels in excess of 65 dBA CNEL/L_{dn} are typically considered to result in a potentially significant increase in levels of annoyance (Caltrans 2002).

Allowing for an average exterior-to-interior noise reduction of 20 dB, an exterior noise level of 65 dBA CNEL/L_{dn} would equate to an interior noise level of 45 dBA CNEL/L_{dn}. An interior noise level of 45 dB CNEL/L_{dn} is generally considered sufficient to protect against activity interference at most noise-sensitive land uses, including residential dwellings, and would also be sufficient to protect against sleep interference (U.S. EPA 1974.) Within California, the California Building Code establishes a noise level of 45 dBA CNEL as the maximum acceptable interior noise level for residential uses (other than detached single-family dwellings). Use of the 45 dBA CNEL threshold is further supported by recommendations provided in the State of California Office of Planning and Research's *General Plan Guidelines*, which recommend an interior noise level of 45 dB CNEL/L_{dn} as the maximum allowable interior noise level sufficient to permit "normal residential activity."

The cumulative noise exposure metric is currently the only noise metric for which there is a substantial body of research data and regulatory guidance defining the relationship between noise exposure, people's reactions, and land use compatibility. However, when evaluating environmental noise impacts involving intermittent noise events, such as aircraft overflights and train passbys, the use of cumulative noise metrics may not provide a thorough understanding of the resultant impact. The general public often finds it difficult to understand the relationship between intermittent noise events and cumulative noise exposure metrics. In such instances, supplemental use of other noise metrics, such as the L_{eq} or L_{max} descriptor, may be helpful as a means of increasing public understanding regarding the relationship between these metrics and the extent of the resultant noise impact (Caltrans 2002).

AFFECTED ENVIRONMENT

NOISE-SENSITIVE LAND USES

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

Sensitive land uses located in the vicinity of the proposed project site consist predominantly of residential land uses. The nearest residential land uses are generally located north of the project site, north of E. Cambridge and E. Yale Avenues.

AMBIENT NOISE ENVIRONMENT

To document existing ambient noise levels in the project area, short-term ambient noise measurements were conducted on May 21, 2019 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter. The meter was calibrated before use and is certified to be in compliance with ANSI specifications. Measured ambient noise levels are summarized in Table 2.

As indicated in Table 2, measured ambient noise levels in the project area ranged from approximately 54 to 67 dBA L_{eq}. Ambient noise levels within the project area are predominantly influenced by vehicle traffic on area roadways. Ambient noise levels during the evening and nighttime hours are generally 5 to 10 dB lower than daytime noise levels.

Table 2
Summary of Measured Ambient Noise Levels

Location	Monitoring Period	Noise Levels (dBA)	
		L_{eq}	L_{max}
N. Calaveras Street. Approximately 25 feet north of E. University Avenue	0710-0720	58.2	69.3
E. University Avenue. Approximately xx feet west of N. Blackstone Avenue	0730-0740	59.6	70.2
1607 E. Cambridge Avenue	0750-0800	56.9	68.3
1305 E. Yale Avenue, Approximately 190 feet west of N. San Pablo Avenue	0810-0820	53.8	56.7
N. Blackstone Avenue at Yale Avenue, Approximately 80 feet from N. Blackstone Avenue centerline	0830-0840	67.3	79.4
Ambient noise measurements were conducted on May 21, 2019 using a Larson Davis Laboratories, Type I, Model 820 integrating sound-level meter.			

REGULATORY FRAMEWORK

NOISE

State of California

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land-use compatibility criteria.

<u>*California General Plan Guidelines*</u>

The *State of California General Plan Guidelines*, published by the Governor's Office of Planning and Research (OPR 2003), also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. For school land uses, the *State of California General Plan Guidelines* identify a "normally acceptable" exterior noise level of up to 70 dBA CNEL/L_{dn}. Schools are considered "conditionally acceptable" within noise environments of 60 to 70 dBA CNEL/L_{dn} and "normally unacceptable" within exterior noise environments of 70 to 80 CNEL/L_{dn} and "clearly unacceptable" within exterior noise environments in excess of 80 dBA CNEL/L_{dn}. Assuming a minimum exterior-to-interior noise reduction of 20 dB, an exterior noise environment of 65 dBA CNEL/L_{dn} would allow for a normally acceptable interior noise level of 45 dBA CNEL/L_{dn}.

City of Fresno

The *Fresno General Plan Noise and Safety Element* includes noise standards for both stationary and transportation noise sources for determination of land use compatibility. In accordance with General Plan policies, new noise-sensitive land uses impacted by existing or projected future transportation or stationary noise sources shall include mitigation measures so that resulting noise levels do not exceed these standards (City of Fresno 2014). The land use compatibility noise standards for non-transportation (stationary) and transportation noise sources are summarized in Tables 3 and 4, respectively. In addition, Policy NS-1-a of the *Fresno General Plan Noise and Safety Element* also establishes an exterior noise standard of 60 dBA CNEL/L_{dn} for new non-transportation noise sources that impinge on noise-sensitive land uses, such as residential dwellings. This noise standard is applied at the property line of the noise-sensitive land use.

The City of Fresno has also adopted a noise ordinance that contains additional limitations intended to prevent noise which may create dangerous, injurious, noxious, or otherwise objectionable conditions. As opposed to the City's General Plan noise standards, the City's noise ordinance is primarily used for the regulation of existing uses and activities, including construction activities, and are not typically used as a basis for land use planning. Construction activities occurring during the daytime hours of 7:00 a.m. to 10:00 p.m., Monday through Saturday, are typically considered exempt from the City's noise ordinance requirements (City of Fresno 2016). In accordance with Section 15-2506(H) of the City's noise ordinance, the sounding of school bells and school-sanctioned outdoor activities such as pep rallies, sports games, and band practices are exempt from the City's noise ordinance standards.

Table 3
City of Fresno General Plan Noise Standards - Stationary Noise Sources

Noise Descriptor	Noise Level Standards (dBA)[1]	
	Daytime (7 am - 10 pm)	Nighttime (10 pm – 7 am)
Hourly Equivalent Sound Level (L_{eq})	50	45
Maximum Sound Level (L_{max})	70	65

Notes:

1. *The Department of Development and Resource Management Director, on a case-by-case basis, may designate land uses other than those shown in this table to be noise-sensitive, and may require appropriate noise mitigation measures.*
2. *As determined at outdoor activity areas. Where the location of outdoor activity areas is unknown or not applicable, the noise exposure standard shall be applied at the property line of the receiving land use. When ambient noise levels exceed or equal the levels in this table, mitigation shall only be required to limit noise to the ambient plus five dB.*

Source: City of Fresno 2014

Table 4
City of Fresno General Plan Noise Standards - Transportation Noise Sources

Land Use[1]	Outdoor Activity Areas[2,3] (CNEL/L_{dn} dBA)	Interior Spaces (dBA)[3]	
		Average Daily (CNEL/L_{dn})	Average Hourly (L_{eq}) [2]
Residential	65	45	--
Transient Lodging	65	45	--
Hospitals, Nursing Homes	65	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	65	--	45
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45

1. *Where the location of outdoor activity areas is unknown or is not applicable, the exterior noise level standard shall be applied to the property line of the receiving land use.*
2. *As determined for a typical worst-case hour during periods of use.*
3. *Noise standards do not apply to aircraft noise.*

Source: City of Fresno 2014

GROUNDBORNE VIBRATION

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating. Vibration can be measured in terms of acceleration, velocity, or displacement.

The effects of groundborne vibration levels, with regard to human annoyance and structural damage, is influenced by various factors, including ground type, distance between source and receptor, and duration. Overall effects are also influenced by the type of the vibration event, defined as either continuous or transient. Continuous vibration events would include most construction equipment, including pile drivers, and compactors; whereas, transient sources of vibration create single isolated vibration events, such as demolition ball drops and blasting. Threshold criteria for continuous and transient events are summarized in Tables 5 and 6, respectively.

Table 5
Damage Potential to Buildings at Various Groundborne Vibration Levels

Structure and Condition	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments	0.12	0.08
Fragile Buildings	0.2	0.1
Historic and Some Old Buildings	0.5	0.25
Older Residential Structures	0.5	0.3
New Residential Structures	1.0	0.5
Modern Industrial/Commercial Buildings	2.0	0.5

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans 2013

Table 6
Annoyance Potential to People at Various Groundborne Vibration Levels

Human Response	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.10
Annoying to People in Buildings	--	0.2
Severe	2.0	0.4

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

-- Not Available

Source: Caltrans 2013

As indicated in Table 5, the threshold at which there is a risk to normal structures from continuous events is 0.5 in/sec ppv for newer building construction. A threshold of 0.5 in/sec ppv also represents the structural damage threshold applied to older structures for transient vibration sources. With regard to human perception (refer to Table 6), vibration levels would begin to become distinctly perceptible at levels of 0.04 in/sec ppv for continuous events and 0.25 in/sec ppv for transient events. Continuous vibration levels are considered annoying for people in buildings at levels of 0.2 in/sec ppv.

IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Short-Term Construction Noise

Short-term noise impacts associated with construction activities were analyzed based on typical construction equipment noise levels and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on an average noise-attenuation rate of 6 dB per doubling of distance from the source.

Long-term Operational Noise

Roadway Traffic Noise

Traffic noise levels were calculated using the Federal Highway Administration (FHWA) roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. The project's contribution to traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic. The compatibility of the proposed land uses were evaluated based on predicted future on-site noise conditions and in comparison to the City of Fresno's interior noise standard of 45 dBA CNEL/L_{dn} for school uses (refer to Table 4).

The *CEQA Guidelines* do not define the levels at which temporary and permanent increases in ambient noise are considered "substantial." As discussed previously in this section, a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and a difference of 10 dBA would be perceived as a doubling of loudness. For purposes of this analysis, a significant increase in ambient noise levels would be defined as an increase of 3 dBA, or greater. Significant increases in ambient noise levels that would exceed applicable noise standards would be considered to have a potentially significant impact.

Non-Transportation Noise

Noise levels associated with vehicle parking areas were calculated in accordance with FHWA's *Transit Noise and Vibration Impact Assessment Guidelines* (2006) assuming a reference noise level of 92 dBA SEL. Average-hourly noise levels were calculated based on hourly on-campus student attendance data provided by the project applicant. Based on the student attendance data provided, maximum on-campus hourly student attendance for the campus was 3,633 students during the daytime hours (7:00 a.m. to 10:00 p.m.) Daytime operational noise levels were calculated based on the total capacity of the parking garage (1,000 spaces) and assuming that all parking spaces could be accessed over a one-hour period. Nighttime operational noise levels were conservatively based on the highest hourly on-campus student attendance for the evening hours (7:00 p.m. to 10:00 p.m.) of 301 students and assuming that all students would utilize the parking garage and depart the structure after 10:00 p.m. Hourly on-campus student attendance for the early morning hours (5:00 a.m. to 7:00 a.m.) are less (i.e., 167 students, or less). As a result, predicted operational noise levels during these early morning hours would be less. Noise levels generated by other on-site noise sources, including on-site building mechanical equipment and recreational uses were assessed based on representative noise data obtained from similar land uses.

Groundborne Vibration

The *CEQA Guidelines* also do not define the levels at which groundborne vibration levels would be considered excessive. For this reason, Caltrans' recommended groundborne vibration thresholds were used for the evaluation of impacts based on increased potential for structural damage and human annoyance, as identified in Table 5 and Table 6, respectively. Based on these levels, groundborne vibration levels would be considered to have a potentially significant impact with regard to potential structural damage if levels would exceed a 0.5 in/sec ppv.

PROJECT IMPACTS

Impact Noise-A:	***Would the project result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?***

Noise generated by the proposed project would occur during short-term construction and long-term operation. Noise-related impacts associated with short-term construction and long-term operations of the proposed project are discussed separately, as follows:

Short-term Construction Noise Levels

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading and excavation, erection) of construction. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Although noise ranges were found to be similar for all construction phases, the initial site preparation phases, including demolition and grading/excavation activities, tend to involve the most equipment and result in the highest average-hourly noise levels.

Noise levels commonly associated with construction equipment are summarized in Table 7. As noted in Table 7, instantaneous noise levels (in dBA L_{max}) generated by individual pieces of construction equipment typically range from approximately 80 dBA to 85 dBA L_{max} at 50 feet (FTA 2006). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Average-hourly noise levels for individual equipment generally range from approximately 73 to 82 dBA L_{eq}. Based on typical off-road equipment usage rates and assuming multiple pieces of equipment operating simultaneously within a localized area, such as soil excavation activities, average-hourly noise levels could reach levels of approximately 80 dBA L_{eq} at roughly 100 feet.

Table 7
Typical Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source	
	L_{max}	L_{eq}
Compactor, Concrete Vibratory Mixer	80	73
Backhoe/Front-End Loader, Air Compressor	80	76
Generator	82	79
Crane, Mobile	85	77
Jack Hammer, Roller	85	78
Dozer, Excavator, Grader, Concrete Mixer Truck	85	81
Paver, Pneumatic Tools	85	82
Sources: FTA 2006		

The City has not adopted noise standards that apply to short-term construction activities. However, based on screening noise criteria commonly recommended by federal agencies, construction activities would generally be considered to have a potentially significant impact if average-hourly daytime noise levels would exceed 80 dBA L_{eq} at noise-sensitive land uses, such as residential land uses (FTA 2006). Depending on the location and types of activities conducted (e.g., building demolition, soil excavation, grading), predicted noise levels at the nearest residences, which are located adjacent to and west of the project site, could potentially exceed 80 dBA L_{eq}. Furthermore, with regard to residential land uses, activities occurring during the more noise-sensitive evening and nighttime hours could result in increased levels of annoyance and potential sleep disruption. For these reasons, noise-generating construction activities would be considered to have a ***potentially significant*** short-term noise impact.

Mitigation Measure Noise-1: The following measures shall be implemented to reduce construction-generated noise levels:

a. Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 10:00 p.m. Construction activities shall be prohibited on Sundays and legal holidays.

b. Construction truck trips shall be scheduled, to the extent feasible, to occur during non-peak hours and truck haul routes shall be selected to minimize impacts to nearby residential dwellings.

c. Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.

d. Stationary construction equipment (e.g., portable power generators) should be located at the furthest distance possible from nearby residences. If deemed necessary, portable noise barriers shall be erected sufficient to shield nearby residences from direct line-of-sight of stationary construction equipment.

e. When not in use, all equipment shall be turned off and shall not be allowed to idle. Provide clear signage that posts this requirement for workers at the entrances to the site.

Significance After Mitigation: Use of mufflers would reduce individual equipment noise levels by approximately 10 dBA. Implementation of the above mitigation measures would limit construction activities to the less noise-sensitive periods of the day. With implementation of the above mitigation measures, this impact would be considered ***less than significant***.

Long-term Operational Noise Levels

Potential long-term increases in noise associated with the proposed project would be primarily associated with the operation of building equipment, such as heating, ventilation, and air conditioning (HVAC) units, outdoor recreational activities, and vehicle use within onsite parking lots.

Maintenance Facility

The proposed project includes the construction of a maintenance and operations center, to be located adjacent to and west of N. San Pablo Avenue, north of E. Cambridge Avenue. Noise generated by maintenance and operations center would be primarily associated with the installation of an air compressor. Additional sources of noise may include the use of pneumatic tools within the automotive shop area. Noise levels commonly associated with air compressors typically average approximately 76 dBA Leq at 50 feet. Pneumatic tools can generate noise levels of approximately 82 dBA L_{eq} at 50 feet, with intermittent noise levels reaching approximately 85 dBA L_{max} at 50 feet. Based on the preliminary plans prepared for the project, the air compressor would be enclosed and shielded from direct line-of-sight of the nearest residential land uses by intervening buildings. The automotive service bay would, likewise, be shielded from the nearest residential land uses by intervening onsite structures. Based on the operational noise levels noted above and assuming 15-dB reductions for the air compressor enclosure and intervening structures, combined operational noise levels would be approximately 54 dBA L_{eq} at the property line of residential uses located to the north, across E. Yale Avenue, and approximately 48 dBA L_{eq} at the property line of residential uses located to the east, across N. San Pablo Avenue. Predicted operational noise levels would exceed the City's daytime and nighttime noise standards (i.e., 50 and 45 dBA L_{eq}) at the property line of residential land uses to the north, and the City's nighttime noise standard at the property line of residential land uses to the east. Maximum instantaneous noise levels associated with the use of pneumatic tools would be approximately 67 dBA L_{max} at the nearest residential property line, which would exceed the City's nighttime noise standard of 65 dBA L_{max}. As a result, this impact would be considered ***potentially significant***.

Building Maintenance & Mechanical Equipment

Proposed structures, including the proposed maintenance and operations center, child development center, science building, and parking structure would be anticipated to include the use of building mechanical equipment, such as air conditioning units and exhaust fans.

The specific building mechanical equipment to be installed and the locations of such equipment have not yet been identified. Building mechanical equipment (e.g., air conditioning units, exhaust fans) would typically be located within the structures, enclosed, or placed on rooftop areas away from direct public exposure. Exterior air conditioning units and exhaust fans can generate noise levels up to approximately 65 dBA L_{eq} at 10 feet. Depending on type and location of onsite equipment, predicted operational noise levels at nearby residential land uses could exceed the City's applicable exterior daytime and nighttime noise standards of 50 and 45 dBA L_{eq}, respectively (refer to Table 3).

In addition to building mechanical equipment operations, landscape maintenance and waste-collection activities may also result in significant increases in ambient noise levels at nearby residential land uses, particularly if such activities were to occur during the more noise-sensitive nighttime hours. As a result, noise generated by onsite building maintenance and mechanical equipment would be considered to have a **potentially-*significant*** impact.

Recreational Facilities

The proposed project includes the construction of a child development center, which would be anticipated to include outdoor recreational-use facilities, such as playgrounds. Noise generated by small playgrounds typically includes elevated children's voices and occasional adult voices. Based on measurement data obtained from similar land uses, noise levels associated with small playgrounds can generate intermittent noise levels of approximately 55-60 dBA L_{eq} at 50 feet. The proposed child development center would be constructed in the same general location of the existing child development center. As a result, operational noise levels associated with exterior recreational facilities would be similar to noise levels associated recreational facilities at the existing use. As a result, significant increases in ambient noise levels would not be anticipated to occur. In addition, no noise-sensitive land use were identified in the vicinity of the proposed child development center that would be adversely affected by outdoor recreational noise events. Noise generated by recreational facilities would be considered to have a ***less-than-significant*** impact.

Vehicle Parking Areas & Structures

The proposed project includes the construction of various surface parking lots, as well as, an approximate 1,000-space parking garage. The parking garage would be located east of N. Glenn Avenue, between E. Cambridge Avenue and E. Weldon Avenue. Predicted operational noise levels for the parking lot are summarized in Table 8. Refer to Appendix A for modeling assumptions and results.

Based on a conservative assumption that all parking spaces within the parking garage were to be accessed over a one-hour period, predicted daytime noise levels at the property line of the nearest residential dwellings, which are located adjacent to and north of E. Cambridge Avenue, would be 47 dBA L_{eq}. During the nighttime hours, when student attendance is less, predicted parking garage noise levels are estimated to average approximately 41 dBA L_{eq}, or less. Predicted operational noise levels associated with other smaller surface parking areas would be less. During the daytime hours, predicted operational noise levels would be largely masked by ambient noise levels, which generally range from the low to mid 50's (in dBA L_{eq}) and are predominantly influenced by vehicle traffic noise on area roadways. Predicted noise levels would not exceed the City's daytime or nighttime noise standards of 50 and 45 dBA L_{eq}, respectively. As a result, this is considered a ***less-than-significant*** impact.

Table 8
Predicted Parking Garage Operational Noise Levels

Day of Week/Period of Day	Noise Level at the Nearest Residential Property Line (dBA L_{eq})	Exceeds Standards/ Significant Impact?[1]
Weekday – Daytime (7:00 a.m. to 10:00 p.m.)[2]	47	No
Weekday – Nighttime (10:00 p.m. to 7:00 a.m.)[3]	41	No
Saturday – Daytime (7:00 a.m. to 10:00 p.m.)[4]	36	No

Noise levels associated with vehicle parking areas were calculated in accordance with FHWA's Transit Noise and Vibration Impact Assessment Guidelines (2006).

1. *The City's daytime and nighttime noise standards are 50 and 45 dBA L_{eq}, respectively, applied at outdoor activity areas. To be conservative, predicted noise levels were calculated at the property line of the nearest residential land uses.*
2. *Based on the total capacity of the parking garage (1,000 spaces) and assuming that all parking spaces could be accessed over a one-hour period.*
3. *Based on the highest hourly on-campus student attendance for the evening hours (7:00 p.m. to 10:00 p.m.) of 301 students and assuming that all students would utilize the parking garage and depart the structure after 10:00 p.m. Based on student attendance data, hourly on-campus student attendance/parking garage use for the early morning hours (5:00 a.m. to 7:00 a.m.) would be less.*
4. *Based on the highest hourly on-campus student attendance of 93 students and assuming that all students would utilize the parking garage and depart the structure over a one-hour period. Based on student attendance data, use of the parking garage during Saturday nighttime hours and Sundays would be less.*

Source: FTA 2006

Roadway Traffic

Predicted existing traffic noise levels, with and without implementation of proposed project, are summarized in Table 9. In comparison to existing traffic noise levels, the proposed project would result in a predicted increase in traffic noise levels of 0.3 to 4.6 along area roadways.

Predicted increases in future cumulative traffic noise levels along nearby roadways for proposed project are summarized in Table 10. In future years, the project's contribution to cumulative traffic noise levels would be anticipated to decline slightly as increases in vehicle traffic due to surrounding development increases. Under future cumulative conditions, the proposed project would result in predicted increases in traffic noise levels of 0.3 to 4.5 along area roadways.

As noted earlier in this report, changes in ambient noise levels of approximately 3 dBA, or less, are typically not discernible to the human ear and would not be considered to result in a significant impact. Implementation of the proposed project would result in a significant increase (i.e., 3 dBA, or greater) in existing and projected future traffic noise levels along E. Cambridge Avenue, west of N. Blackstone Avenue. However, predicted traffic noise levels along this roadway segment would not be projected to exceed the City's exterior noise standard of 65 dBA CNEL at adjacent residential land uses. As a result, this impact would be considered ***less than significant***.

Table 9
Predicted Increases in Existing Traffic Noise Levels

Roadway Segment	Predicted Noise Level at 50 feet from Centerline of Near Travel Lane (dBA CNEL/L_{dn})[1]			
	Existing Without Project	Existing With Project	Difference[2]	Significant Impact?[3]
N. San Pablo Ave., South of E. Clinton Ave.	48.7	50.3	1.6	No
N. Glenn Ave., South of E. Clinton Ave.	51.6	52.9	1.3	No
E. Cambridge Ave., West of N. Blackstone Ave.	50.1	54.7	4.6	No
N. Blackstone Ave., South of E. Cambridge Ave.	66.4	66.8	0.3	No

1. Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108), based on data obtained from the traffic analysis prepared for this project.
2. Difference in noise levels reflects the incremental increase attributable to the proposed project.
3. Defined as a substantial increase in ambient noise levels in excess of the City's exterior noise standard of 65 dBA CNEL.

Table 10
Predicted Increases in Future Traffic Noise Levels

Roadway Segment	Predicted Noise Level at 50 feet from Centerline of Near Travel Lane (dBA CNEL/L_{dn})[1]			
	Future Without Project	Future With Project	Difference[2]	Significant Impact?[3]
N. San Pablo Ave., South of E. Clinton Ave.	48.7	50.3	1.6	No
N. Glenn Ave., South of E. Clinton Ave.	51.7	53.0	1.3	No
E. Cambridge Ave., West of N. Blackstone Ave.	50.2	54.7	4.5	No
N. Blackstone Ave., South of E. Cambridge Ave.	67.2	67.5	0.3	No

1. Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108), based on data obtained from the traffic analysis prepared for this project.
2. Difference in noise levels reflects the incremental increase attributable to the proposed project.
3. Defined as a substantial increase in ambient noise levels in excess of the City's exterior noise standard of 65 dBA CNEL.

Land Use Compatibility

The Fresno City General Plan Noise Element includes noise standards for determination of land use compatibility for new land uses. As previously discussed, the City's "normally acceptable" exterior noise standards for schools is 65 dBA CNEL/L_{dn}.

As noted earlier in this report, ambient noise levels in the project area are largely influenced by traffic noise on area roadways. Under future cumulative conditions, with project-generated vehicle traffic included, the predicted 65 dBA CNEL/L_{dn} noise contour for N. Blackstone Avenue would extend to 129 feet from the roadway centerline. Based on preliminary site plans, the proposed science building would be located approximately 85 feet from the centerline of N. Blackstone Avenue. Based on this setback distance, predicted traffic noise levels at the nearest building façade would be 68 dBA CNEL/L_{dn}. With compliance with current building insulation standards, average exterior-to-interior noise reductions for newly constructed buildings typically range from approximately 25-30 dB. Assuming an exterior noise level of 68 dBA CNEL/L_{dn} and a minimum exterior-to-interior noise reduction of 25 dB, predicted interior noise levels within the proposed science building would be approximately 43 dBA CNEL/L_{dn}, or less. Predicted interior noise levels would not exceed the City's applicable interior noise standard of 45 dBA CNEL/L_{dn}. The projected 65 dBA CNEL contour for other area roadways, including E. University Avenue and N. San Pablo Avenue, are not projected to extend beyond the roadway right-of-way. As a result, other proposed land uses, including the proposed child development center and maintenance and operations facilities, would not be projected to exceed applicable City noise standards for land use compatibility. As a result, this impact would be considered ***less than significant***.

Mitigation Measure Noise-2a: The following measures shall be implemented to reduce long-term operational noise impacts:

- An acoustical analysis shall be prepared for proposed onsite buildings/facilities prior to final design. The purpose of the acoustical analysis is to evaluate operational noise levels associated with on-site building mechanical equipment (e.g., air conditioning units, exhaust fans) in comparison to applicable City of Fresno's exterior daytime and nighttime noise standards of 50 and 45 dBA L_{eq}. The acoustical analysis shall identify noise-reduction measures to be incorporated sufficient to achieve applicable noise standards. Noise-reduction measures to be incorporated may include, but are not limited to, the selection of alternative or quieter equipment, use of equipment enclosures, site design, and construction of noise barriers (i.e., walls).
- Operation of the proposed maintenance and operations center shall be limited to between the hours of 7:00 a.m. to 10:00 p.m.
- Stationary equipment (e.g., air compressors) to be located at the proposed maintenance and operations center shall be enclosed and shielded from direct line-of-sight of nearby residential land uses.
- Exterior doors of the automotive service bay located within the proposed maintenance and operations center shall be closed when using noise-generating equipment (e.g., pneumatic tools).
- Landscape maintenance and waste-collection activities, shall be limited to between the hours of 7:00 a.m. to 10:00 p.m.
- Any stationary equipment (e.g., air compressors) to be installed at the proposed maintenance facility shall be enclosed, located at the furthest distance from nearby residential land uses, and shielded from direct line of sight of nearby residential land uses.

Significance After Mitigation

Implementation of Mitigation Measure Noise-2a would limit on-site maintenance activities including activities conducted at the proposed maintenance facility, landscape maintenance, and waste-collection activities, to the daytime hours of operation. Additional measures have been included to further reduce operational noise levels associated with the proposed maintenance and operations center. With mitigation, predicted noise levels associated with operation of the proposed maintenance and operations center would be reduced to 49 dBA L_{eq}, or less, at the nearest residential property lines. In addition, an acoustical analysis would also be required, prior to final site design, to further evaluate noise levels associated with building mechanical equipment (e.g., exhaust fans, air conditioning units) and to incorporate additional mitigation sufficient to achieve applicable City of Fresno noise standards. The proposed parking structure would be designed with a solid façade along the northern side of the structure. Assuming a minimum noise reduction of 5 dB for the proposed solid façade, predicted operational noise levels at the nearest residential land uses would be reduced to approximately 42 dBA L_{eq}. Predicted operational noise levels would not exceed the City's noise standards. In addition, vehicular access to the parking structure from E. Cambridge Avenue would be limited to the daytime hours of operation, which would further reduce operational noise levels at existing residential land uses located adjacent to and north of E. Cambridge Avenue. With mitigation, noise impacts associated with on-site non-transportation noise sources would be considered ***less than significant***.

Impact Noise-B.	***Would the project result in the generation of excessive groundborne vibration or groundborne noise levels?***

Long-term operational activities associated with the proposed project would not involve the use of any equipment or processes that would result in potentially significant levels of ground vibration. Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with short-term construction-related activities. Construction activities associated with the proposed improvements would likely require the use of various off-road equipment, such as tractors, concrete mixers, and haul trucks. The use of major groundborne vibration-generating construction equipment, such as pile drivers, would not be required for this project.

Groundborne vibration levels associated with representative construction equipment are summarized in Table 11. As depicted, ground vibration generated by construction equipment would be approximately 0.089 in/sec ppv, or less, at 25 feet. Predicted vibration levels at the nearest existing structures would not be anticipated to exceed commonly applied criteria for structural damage or human annoyance (i.e., 0.5 and 0.2 in/sec ppv, respectively). In addition, no fragile or historic structures have been identified in the project area. As a result, this impact would be considered ***less than significant***.

Table 11
Representative Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 25 Feet (In/Sec)
Large Bulldozer	0.089
Loaded Truck	0.076
Jackhammer	0.035
Small Bulldozer	0.003
Source: FTA 2006, Caltrans 2004	

Impact Noise-C. ***For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

The nearest airports in the project vicinity include the Fresno Yosemite International Airport and the Fresno Chandler Downtown Airport, which are located approximately 3.1 and 2.6 miles to the east and southwest, respectively. The proposed project is not located within the projected 60 dBA CNEL/L_{dn} noise contours of these airports (City of Fresno 2014). No private airstrips were identified within two miles of the project site. Implementation of the proposed project would not result in the exposure of sensitive receptors to aircraft noise levels nor would the proposed project affect airport operations. This impact is considered ***less than significant***.

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APPENDIX A

Noise Prediction Modeling & Supportive Documentation

PARKING GARAGE NOISE MODELING ASSUMPTIONS

STUDENT HOURLY HEAD COUNT

	STUDENT HEAD COUNT BY HOUR OF DAY (SECTION START TIME)																	DAYTIME (7AM-10PM)	NIGHTTIME (10PM-7AM)
DAY	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	MAX. HOURLY	MAX. HOURLY
MONDAY	0	156	1,060	3,506	3,393	2,111	3,351	3,016	2,140	2,400	1,397	1,040	605	2,315	392	180	106	3,506	180
TUESDAY	0	63	1,072	3,501	3,194	2,362	3,578	2,515	2,112	2,547	1,538	1,079	613	2,662	538	203	167	3,578	203
WEDNESDAY	0	167	1,102	3,633	3,509	2,180	3,432	3,047	2,267	2,423	1,441	1,034	788	2,278	461	191	257	3,633	257
THURSDAY	12	143	968	3,432	3,160	2,255	3,413	2,626	2,161	2,610	1,479	1,064	615	2,420	416	301	177	3,432	301
FRIDAY	0	93	426	1,091	1,081	643	773	384	564	197	122	0	24	27	24	0	0	1,091	93
SATURDAY	0	0	24	195	194	51	51	48	0	0	0	0	0	0	0	0	0	195	0
**Based on data provided by the project applicant.*																		5.4%	

ESTIMATED PARKING GARAGE VEHICLE USE

PARKING GARAGE MAX. CAPACITY:	1,000	SPACES
WEEKDAY - DAYTIME:	1,000	*BASED ON MAXIMUM CAPACITY.*
WEEKDAY - NIGHTTIME:	301	*BASED ON WEEKDAY STUDENT HEAD COUNT RANGE OF ~5-9% OF DAYTIME HOURLY MAX. REFER TO ABOVE TABLE.*
SATURDAY - DAYTIME:	93	*BASED ON MAXIMUM SATURDAY STUDENT HEAD COUNT FOR DAYTIME HOURS. REFER TO ABOVE TABLE.*
SATURDAY - NIGHTTIME:	N/A	*N/A, PER STUDENT HEAD COUNT*

PREDICTED PARKING GARAGE NOISE LEVELS

Distance from Source Center to Residential Property Line: 125 feet

	dBA Leq	Threshold	Exceeds
WEEKDAY - DAYTIME:	47	50	No
WEEKDAY - NIGHTTIME:	41	45	No
SATURDAY - DAYTIME:	36	50	No
SATURDAY - NIGHTTIME:	NA	NA	NA

**Calculated in accordance with FTA guidance using FTA's Noise Impact Assessment Spreadsheet (2018).*

SUMMARY OF PREDICTED NOISE LEVELS

SCENARIO	ROADWAY SEGMENT	VOLUME (ADT)	SPEED (MPH)	AHW	CNEL AT 50' FROM NTLCL	DISTANCE TO NOISE CONTOURS (FEET FROM ROAD CENTERLINE)			
						70	65	60	55
EXISTING WITHOUT PROJECT									
	SAN PABLO AVENUE, SOUTH OF CLINTON AVENUE	630	25	6	48.7	0	0	0	0
	GLENN AVENUE, SOUTH OF CLINTON AVENUE	1,230	25	6	51.6	0	0	0	0
	CAMBRIDGE AVENUE, WEST OF BLACKSTONE AVENUE	860	25	6	50.1	0	0	0	0
	BLACKSTONE AVENUE, SOUTH OF CAMBRIDGE AVENUE	22,150	40	44	66.4	0	112.5	227.3	482.4
EXISTING WITH PROJECT									
	SAN PABLO AVENUE, SOUTH OF CLINTON AVENUE	900	25	6	50.3	0	0	0	0
	GLENN AVENUE, SOUTH OF CLINTON AVENUE	1,660	25	6	52.9	0	0	0	0
	CAMBRIDGE AVENUE, WEST OF BLACKSTONE AVENUE	2,500	25	6	54.7	0	0	0	53.5
	BLACKSTONE AVENUE, SOUTH OF CAMBRIDGE AVENUE	23,810	40	44	66.8	66.9	117.2	238.1	506
FUTURE CUMULATIVE WITHOUT PROJECT									
	SAN PABLO AVENUE, SOUTH OF CLINTON AVENUE	630	25	6	48.7	0	0	0	0
	GLENN AVENUE, SOUTH OF CLINTON AVENUE	1,240	25	6	51.7	0	0	0	0
	CAMBRIDGE AVENUE, WEST OF BLACKSTONE AVENUE	880	25	6	50.2	0	0	0	0
	BLACKSTONE AVENUE, SOUTH OF CAMBRIDGE AVENUE	26,370	40	44	67.2	69.6	124.3	254.3	541.3
FUTURE CUMULATIVE WITH PROJECT									
	SAN PABLO AVENUE, SOUTH OF CLINTON AVENUE	900	25	6	50.3	0	0	0	0
	GLENN AVENUE, SOUTH OF CLINTON AVENUE	1,670	25	6	53.0	0	0	0	0
	CAMBRIDGE AVENUE, WEST OF BLACKSTONE AVENUE	2,520	25	6	54.7	0	0	0	53.8
	BLACKSTONE AVENUE, SOUTH OF CAMBRIDGE AVENUE	28,030	40	44	67.5	71.4	128.9	264.6	563.7

CHANGES IN PREDICTED TRAFFIC NOISE LEVELS WITH PROJECT IMPLEMENTATION

ROADWAY SEGMENT	CNEL AT 50' FROM NEAR-TRAVEL-LANE CENTERLINE					
	EXISTING WITHOUT PROJECT	EXISTING WITH PROJECT	CHANGE	FUTURE CUMULATIVE WITHOUT PROJECT	FUTURE CUMULATIVE WITH PROJECT	CHANGE
SAN PABLO AVENUE, SOUTH OF CLINTON AVENUE	48.7	50.3	1.6	48.7	50.3	1.6
GLENN AVENUE, SOUTH OF CLINTON AVENUE	51.6	52.9	1.3	51.7	53.0	1.3
CAMBRIDGE AVENUE, WEST OF BLACKSTONE AVENUE	50.1	54.7	4.6	50.2	54.7	4.6
BLACKSTONE AVENUE, SOUTH OF CAMBRIDGE AVENUE	66.4	66.8	0.3	67.2	67.5	0.3

NOISE MEASUREMENT SURVEY FORM

DATE:	21-May-19
NOISE MONITORING LOCATION	FRESNO CITY COLLEGE

MET CONDITIONS:	TEMP: 55-58 F. HUMIDITY: 67-70% WIND SPEED: 5-7 MPH SKY: OVERCAST GROUND: DRY
NOISE MONITORING EQUIPMENT:	LARSON DAVIS MODEL 820 LXT, TYPE I SLM

CALIBRATED PRIOR TO AND UPON COMPLETION OF MEASUREMENTS: YES

LOCATION	MONITORING PERIOD	LOCATION DESCRIPTION	NOISE LEVEL			NOTES
			LEQ		LMAX	
1	0710-0720	N.CALAVERAS ST N. OF E. UNIV. AVE, AT PROPERTY LINE	58.2		69.3	VEH. TRAFFIC PRIMARY
2	0730-0740	E. UNIV. AVE, AT PROPERTY LINE	59.6		70.2	VEH. TRAFFIC PRIMARY
3	0750-0800	1607 E CAMBRIDGE AVE, AT PROPERTY LINE	56.9		68.3	VEH. TRAFFIC PRIMARY
4	0810-0820	1305 E YALE AVE, ~190' W. OF N. SAN PABLO AVE	53.8		56.7	BIRDS. DISTANT MECHANICAL EQUIPMENT
5	0830-0840	BLACKSTONE AVE AT E YALE AVE, ~80' FROM BLACKSTONE AVE CENTERLINE	67.3		79.4	VEH. TRAFFIC PRIMARY

APPENDIX 6

Traffic Impact Analysis

Traffic Impact Analysis

State Center Community College District
Fresno City College
Parking and Facilities Expansion

Located at Northwest Quadrant of
Blackstone Avenue and McKinley Avenue

In the City of Fresno, California

Prepared for:
State Center Community College District
1171 Fulton Street
Fresno, CA 93721

September 25, 2019

JLB Project No. 004-085

JLB TRAFFIC ENGINEERING, INC.

Traffic Engineering, Transportation Planning, & Parking Solutions
516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
Phone: (559) 570-8991
www.JLBtraffic.com

Traffic Engineering, Transportation Planning, & Parking Solutions

Traffic Impact Analysis

For the State Center Community College District Fresno City College Parking and Facilities Expansion located at the Northwest Quadrant of Blackstone Avenue and McKinley Avenue

In the City of Fresno, CA

September 25, 2019

This Traffic Impact Analysis has been prepared under the direction of a licensed Traffic Engineer. The licensed Traffic Engineer attests to the technical information contained therein and has judged the qualifications of any technical specialists providing engineering data from which recommendations, conclusions, and decisions are based.

Prepared by:

Jose Luis Benavides, PE, TE

President

Traffic Engineering, Transportation Planning, & Parking Solutions

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

Phone: (559) 570-8991

www.JLBtraffic.com

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Introduction and Summary

Introduction

This report describes a Traffic Impact Analysis (TIA) prepared by JLB Traffic Engineering, Inc. (JLB) for the State Center Community College District (District) Environmental Impact Report (EIR) for the proposed Parking and Facilities Expansion of the Fresno City College (FCC) campus (Project) located on and adjacent to the northeast portion of the existing FCC campus in the City of Fresno. The Project consists of the following facilities:

a) Construction of a parking structure on the south side of Cambridge Avenue west of Blackstone Avenue located north of the existing district office building. The proposed parking structure would have a capacity for up to 1,000 parking spaces, include up to five levels of parking, and include ingress/egress points at Weldon Avenue, the Glenn Avenue southerly extension and potentially Cambridge Avenue.
b) Construction of a three-story Science Building approximately 95,000 square-foot located near the southwest corner of Blackstone Avenue and Weldon Avenue. The new Science Building is proposed to include six (6) biology labs, three (3) anatomy and physiology labs, five (5) chemistry labs, two (2) physics labs, two (2) engineering labs, a computer lab, three (3) general educational classrooms, four (4) Design Science (Middle College) classrooms, a welcome center, tutorial space, and 34 faculty offices. Surface parking would also be added adjacent to the building. Existing Maintenance and Operations facilities located in this area would be removed and relocated to a different area of the campus (see section d below).
c) Replacement of the existing one-story, 5,255 square-foot Child Development Center with a new one-story, 16,480 square-foot Child Development Center at its current location.
d) Construction of a one-story, 10,000 square-foot Maintenance and Operations building plus a parking and storage area on the west side of San Pablo Avenue northwest of the existing Health Sciences Building.
e) Repurposing of the existing District administration building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department.

Development of the Project facilities would occur over the next five (5) years. Per information provided to JLB, the Project is consistent with the City of Fresno 2035 General Plan. Figure 1 shows the location of the proposed Project site relative to the surrounding roadway network.

The purpose of the TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process. The TIA primarily focused on evaluating traffic conditions at study intersections that may potentially be impacted by the proposed Project. The Scope of Work was prepared via consultation with the District, City of Fresno, County of Fresno and Caltrans staff.

Summary

The potential traffic impacts of the proposed Project were evaluated in accordance with the standards set forth by the Level of Service (LOS) policy of the City of Fresno, County of Fresno and Caltrans.

Existing Traffic Conditions

- At present, the intersection of Blackstone Avenue and University Avenue exceeds its LOS threshold during both peak periods. To improve the LOS at this intersection, it is recommended that University Avenue access at Blackstone Avenue be limited to right-in, right-out and left-in access only by implementation of a raised median island.

Existing plus Project Traffic Conditions

- At present, the Project is estimated to generate a maximum of 2,045 daily trips, 262 AM peak hour trips and 237 PM peak hour trips. However, the trip generation of the Project will differ as a result of the relocation, expansion and modification of the Project's land uses. At buildout, the proposed Future Project is estimated to generate a maximum of 2,230 daily trips, 287 AM peak hour trips and 268 PM peak hour trips. Compared to the Existing Project Trip Generation, the Future Project Trip Generation is estimated to be slightly higher by 185 daily trips, 25 AM peak hour trips, and 31 PM peak hour trips.
- It is recommended that the Project implement Class I Bike Routes along a) Glenn Avenue within the Project site, b) along the Project's frontage to Cambridge Avenue (between San Pablo Avenue and Blackstone Avenue) and c) Weldon Avenue within the Project site.
- It is recommended that the Project retain the existing walkways that are in a good state and ADA compliant along its frontages to San Pablo Avenue, Blackstone Avenue, Cambridge Avenue, and Weldon Avenue. The Project shall reconstruct walkways where needed to conform to current ADA guidelines.
- Where possible, consideration should be given to the planting of trees to provide shade and help reduce heat during the summer months. Additionally, it is recommended that the District work with FAX to improve headways of the existing transit routes serving the FCC campus.
- As the Project will be used to serve an existing student and employee population, it is likely that the Project would not add VMT per capita. Additionally, the Project site is located near transit services and pedestrian and bicycle networks.
- The portion of the Project that is the parking structure is anticipated to add a total of 1,000 parking spaces, while replacing 189 parking stalls. Therefore, the net change is 811 parking stalls (1,000 new parking stalls - 189 existing parking stalls = 811 net new parking stalls). Given that the current number of general public and metered on-site parking stalls is 2,388 and the Project will add 811 general public parking stalls, the new total of general public and metered on-site parking stalls will be 3,199 parking stalls. Since the parking supply is projected to be up to 3,199 general public and metered on-site parking stalls, it is anticipated that the FCC campus will have sufficient parking supply to accommodate the projected parking demand in the year 2028.

- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that access at these intersections be limited to right-in, right-out and left-in access only by implementation of a raised median island. Additional details as to the recommended improvements for these intersections and any other intersection are presented later in this report.
- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns.

Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue

- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that access at these intersections be limited to right-in, right-out and left-in access only by implementation of a raised median island. Additional details as to the recommended improvements for these intersections and any other intersection are presented later in this report.
- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns.
- When compared to the Existing plus Project Traffic Condition scenario, the prevention of the Parking Structure's access to Cambridge Avenue will encourage most southbound traffic on Blackstone Avenue and all northbound traffic on Blackstone Avenue to enter the site via Weldon Avenue, thus reducing traffic on Cambridge Avenue between Glenn Avenue and Blackstone Avenue. As can be seen from Tables V and VI, the prevention of the Parking Structure's access to Cambridge Avenue is projected to slightly improve the LOS at the intersection of Blackstone Avenue and Cambridge Avenue while the LOS at the intersection of Blackstone Avenue and Weldon Avenue is projected to slightly worsen.

Near Term plus Project Traffic Conditions

- The total trip generation for the Near Term Project is 2,132 daily trips, 171 AM peak hour trips and 150 PM peak hour trips.
- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that access at these intersections be limited to right-in, right-out and left-in access only by implementation of a raised median island. Additional details as to the recommended improvements for these intersections and any other intersection are presented later in this report.
- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns.

Cumulative Year 2035 No Project Traffic Conditions

- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that access at these intersections be limited to right-in, right-out and left-in access only by implementation of a raised median island. Additional details as to the recommended improvements for these intersections and any other intersection are presented later in this report.
- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns.

Cumulative Year 2035 plus Project Traffic Conditions

- Under this scenario, the intersections of Glenn Avenue and Clinton Avenue, Blackstone Avenue and Cambridge Avenue, and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during one or both peak periods. To improve the LOS at these intersections, the addition of lanes and modification of access is recommended. Additional details as to the recommended improvements for these intersections and any other intersection are presented later in this report.
- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns.

Queuing Analysis

- It is recommended that the City consider left-turn and right-turn lane storage lengths as indicated in the Queuing Analysis.

Project's Equitable Fair Share

- It is recommended that the Project contribute its equitable fair share as listed in Table XII for the existing funding shortfall, if any, to future improvements necessary to maintain an acceptable LOS.

Scope of Work

The TIA primarily focused on evaluating traffic conditions at study intersections that may potentially be impacted by the proposed Project. On April 23, 2019, a Draft Scope of Work for the preparation of a TIA for this Project was provided to the City of Fresno, County of Fresno and Caltrans for their review and comment. The Draft Scope of Work was based on communication with City of Fresno staff. Any comments to the proposed Scope of Work were to be provided by May 14, 2019.

On April 29, 2019, the County of Fresno responded and approved the Draft Scope of Work as presented. Similarly, on May 24, 2019, Caltrans responded and approved the Draft Scope of Work as presented. On May 28, 2019, the City of Fresno responded to the Draft Scope of Work and requested that the intersection of Blackstone Avenue and McKinley Avenue be included as a study intersection.

Based on the comments received, this TIA includes the analysis of the additional intersection as requested by the City of Fresno. The Draft Scope of Work and the comments received from the lead agency and responsible agencies are included in Appendix A.

Study Facilities

The majority of the existing peak hour turning movement volume counts were conducted at the study intersections in April 2019. Since the City of Fresno provided comments after the requested deadline of May 14, counts for the additional study intersections were not collected till early June 2019, while most schools in the vicinity of the proposed Project were in session - Fresno City College was out for summer break. Therefore, any counts collected in June were prorated upward to closely match upstream and downstream traffic counts collected while all schools in the vicinity of the Project were in session. The intersection turning movement counts included pedestrian and bicycle volumes. The traffic counts for the existing study intersections are contained in Appendix B. The existing intersection turning movement volumes, intersection geometrics and traffic controls are illustrated in Figure 2.

Study Intersections

1. San Pablo Avenue / Clinton Avenue
2. Glenn Avenue / Clinton Avenue
3. Blackstone Avenue / Cambridge Avenue
4. Blackstone Avenue / Weldon Avenue
5. Blackstone Avenue / University Avenue
6. Blackstone Avenue / McKinley Avenue

Project Only Trips to State Facilities

1. State Route 41 at McKinley Avenue Interchange
2. State Route 180 at Blackstone Avenue/Abby Street Interchange

Study Scenarios

Existing Traffic Conditions

This scenario evaluates the Existing Traffic Conditions based on existing traffic volumes and roadway conditions from traffic counts and field surveys conducted in April and June 2019. June counts were prorated upward to closely match upstream and downstream traffic counts collected while all schools in the vicinity of the Project were in session.

Existing plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Existing plus Project Traffic Conditions. The Existing plus Project traffic volumes were obtained by adding the Project Only Trips to the Existing Traffic Conditions scenario. The Net New Project Only Trips to the study facilities were developed based on existing travel patterns, the Fresno COG Project Select Zones, the existing roadway network, engineering judgment, data provided by the District, knowledge of the study area, existing residential and commercial densities, and the City of Fresno 2035 General Plan Circulation Element in the vicinity of the Project. The Fresno COG Models for the Project Select Zones are contained in Appendix C.

Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue

This scenario evaluates total traffic volumes and roadway conditions based on the Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue. The Existing plus Project - No Parking Structure Access to Cambridge Avenue traffic volumes were obtained by adjusting the anticipated trip distribution of the Parking Structure component of the proposed Project. This scenario assumes that the Parking Structure will not have direct access to Cambridge Avenue.

Near Term plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Near Term plus Project Traffic Conditions. The Near Term plus Project traffic volumes were obtained by adding the Near Term related trips to the Existing plus Project Traffic Conditions scenario.

Cumulative Year 2035 No Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2035 No Project Traffic Conditions. The Cumulative Year 2035 No Project traffic volumes were obtained by subtracting Project Only Trips from the Cumulative Year 2035 plus Project traffic volumes.

Cumulative Year 2035 plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2035 plus Project Traffic Conditions. The Cumulative Year 2035 plus Project traffic volumes were obtained from the Fresno COG traffic model runs (Base Year 2019 and Cumulative Year 2035) and existing traffic counts. Under this scenario, the increment method, as recommended by the Model Steering Committee was utilized to determine the Cumulative Year 2035 plus Project traffic volumes. The Fresno COG models are contained in Appendix C.

Level of Service Analysis Methodology

Level of Service (LOS) is a qualitative index of the performance of an element of the transportation system. LOS is a rating scale running from "A" to "F", with "A" indicating no congestion of any kind and "F" indicating unacceptable congestion and delays. LOS in this study describes the operating conditions for signalized and unsignalized intersections.

The *Highway Capacity Manual* (HCM) 6th Edition is the standard reference published by the Transportation Research Board and contains the specific criteria and methods to be used in assessing LOS. U-turn movements were analyzed using HCM 2000 methodologies and would yield more accurate results for the reason that HCM 6 methodologies do not allow the analysis of U-turns. Synchro software was used to define LOS in this study. Details regarding these calculations are included in Appendix D.

Criteria of Significance

The City of Fresno 2035 General Plan has established various degrees of acceptable LOS on its major streets, which are dependent on four (4) Traffic Impact Zones (TIZs) within the City of Fresno. The standard LOS threshold for TIZ I is LOS F, that for TIZ II is LOS E, that for TIZ III is LOS D, and that for TIZ IV is LOS E. Additionally, the 2035 MEIR made findings of overriding consideration to allow a lower LOS threshold that that established by the underlying TIZ. For those cases in which a LOS criterion for a roadway segment differs from that of the underlying TIZ, such criteria are identified in the roadway description. In this case, all study facilities fall within TIZ II, therefore LOS E is used to evaluate the potential significance of LOS impacts to study intersections.

The County of Fresno has established LOS C as the acceptable level of traffic congestion on county roads and streets that fall entirely outside the Sphere of Influence (SOI) of a City. For those areas that fall within the SOI of a City, the LOS criteria of the City are the criteria of significance used in this report. LOS C is used to evaluate the potential significance of LOS impacts to Fresno County intersections that fall outside the City of Fresno SOI. In this case, all study facilities fall within the City of Fresno SOI, therefore, the City of Fresno LOS thresholds are utilized.

Caltrans endeavors to maintain a target LOS at the transition between LOS C and D on State highway facilities consistent with the *Caltrans Guide for the Preparation of Traffic Impact Studies* dated December 2002. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. In this TIA, however, all study facilities fall within the City of Fresno. Therefore, the City of Fresno LOS thresholds are utilized.

Operational Analysis Assumptions and Defaults

The following operational analysis values, assumptions and defaults were used in this study to ensure a consistent analysis of LOS among the various scenarios.

- Yellow time consistent with the California Manual of Uniform Traffic Control Devices (CA MUTCD) based on approach speeds
- Yellow time of 3.2 seconds for left-turn phases
- All-red clearance intervals of 1.0 second for all phases
- Walk intervals of 7.0 seconds
- Flashing Don't Walk based on 3.5 feet/second walking speed with yellow plus all-red clearance subtracted and 2.0 seconds added
- All new or modified signals utilize protective left-turn phasing, unless otherwise noted
- A 3 percent heavy vehicle factor for all major street to major street movements and a 1 percent heavy vehicle factor to and from minor streets
- The number of observed pedestrians at existing intersections was utilized under all study scenarios
- At existing intersections, the observed approach Peak Hour Factor (PHF) is utilized in the Existing, Existing plus Project, and Near Term plus Project scenarios.
- A PHF of 0.92, or the existing PHF if higher, is utilized for the Cumulative Year 2035 scenarios

Existing Traffic Conditions

Roadway Network

The Project site and surrounding study area are illustrated in Figure 1. Important roadways serving the Project are discussed below.

San Pablo Avenue is an existing north-south two-lane local street adjacent to the proposed Project. In this area, San Pablo Avenue exists as a two-lane undivided local street between Clinton Avenue and Cambridge Avenue. The City of Fresno 2035 General Plan Circulation Element designates San Pablo Avenue as a two-lane local street between Clinton Avenue and Cambridge Avenue.

Glenn Avenue is an existing north-south two-lane local street in the vicinity of the proposed Project. In this area, Glenn Avenue exists as a two-lane undivided local street between Clinton Avenue and Cambridge Avenue. The City of Fresno 2035 General Plan Circulation Element designates Glenn Avenue as a two-lane local street between Clinton Avenue and Cambridge Avenue.

Blackstone Avenue is an existing north-south six-lane divided arterial adjacent to the proposed Project. In this area, Blackstone Avenue exists as a six-lane divided arterial between Nees Avenue and Hedges Avenue, and two one-way three-lane roadways (Blackstone Avenue and Abby Street) between Hedges Avenue and Divisadero Street. The City of Fresno 2035 General Plan Circulation Element designates Blackstone Avenue as a six-lane arterial between Nees Avenue and Hedges Avenue and a four-lane arterial between Hedges Avenue and Divisadero Street.

Clinton Avenue is an existing east-west four-lane collector in the vicinity of the proposed Project. In this area, Clinton Avenue exists west of Chestnut Avenue through the City of Fresno and east of Clovis Avenue through the City of Fresno. The City of Fresno 2035 General Plan Circulation Element designates Clinton Avenue predominantly as a four-lane collector through the City of Fresno.

Cambridge Avenue is an existing east-west two-lane local street adjacent to the proposed Project. In this area, Cambridge Avenue exists as a two-lane local street between San Pablo Avenue and Thesta Avenue. The City of Fresno 2035 General Plan Circulation Element designates Cambridge Avenue as a two-lane local street between San Pablo Avenue and Thesta Avenue.

Weldon Avenue is an existing east-west two-lane local street adjacent to the proposed Project. In this area, Weldon Avenue exists as a two-lane local street west of Blackstone Avenue. Weldon Avenue is the major access point to Fresno City College off of Blackstone Avenue. The City of Fresno 2035 General Plan Circulation Element designates Weldon Avenue as a local street west of Blackstone Avenue.

University Avenue is an existing east-west two-lane local street adjacent to the proposed Project. In this area, University Avenue exists a two-lane local street between Calaveras Street and Fresno Street. The City of Fresno 2035 General Plan Circulation Element designates University Avenue as a local street between Calaveras Street and Fresno Street.

McKinley Avenue is an existing east-west four-lane divided arterial in the vicinity of the proposed Project. In this area, McKinley Avenue exists predominantly as a four-lane arterial west of Clovis Avenue. The City of Fresno 2035 General Plan Circulation Element designates McKinley Avenue as a predominantly four-lane arterial west of Clovis Avenue.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Existing Traffic Conditions scenario. These warrants are found in Appendix K. These warrants were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized intersections satisfy the peak hour signal warrant during either peak period.

Results of Existing Level of Service Analysis

Figure 2 illustrates the Existing Traffic Conditions turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Existing Traffic Conditions scenario are provided in Appendix E. Table I presents a summary of the Existing peak hour LOS at the study intersections.

At present, the intersection of Blackstone Avenue and University Avenue exceeds its LOS threshold during both peak periods. To improve the LOS at this intersection, it is recommended that the following improvements be implemented.

- Blackstone Avenue / University Avenue
    - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

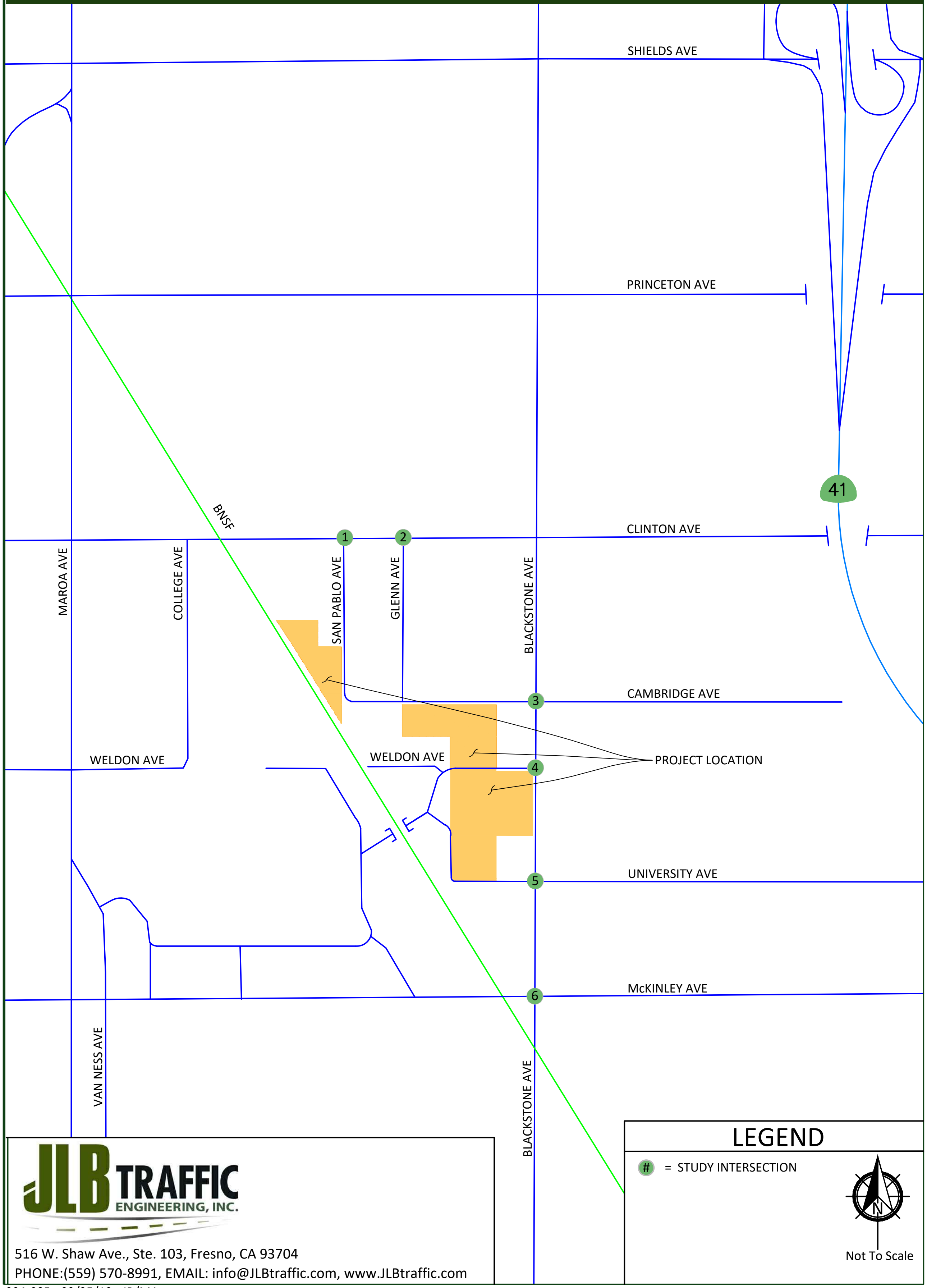
Table I: Existing Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*AM (7-9) Peak Hour*		*PM (4-6) Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	San Pablo Avenue / Clinton Avenue	One-Way Stop	28.3	D	21.3	C
2	Glenn Avenue / Clinton Avenue	One-Way Stop	26.6	D	25.2	D
3	Blackstone Avenue / Cambridge Avenue	Two-Way Stop	36.2	E	48.8	E
4	Blackstone Avenue / Weldon Avenue	Signalized	9.8	A	10.1	B
5	Blackstone Avenue / University Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Improved)	15.0	C	17.9	C
6	Blackstone Avenue / McKinley Avenue	Signalized	26.7	C	28.3	C

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.

FCC Parking and Facilities Expansion - City of Fresno
Vicinity Map

Figure 1



JLB TRAFFIC ENGINEERING, INC.
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

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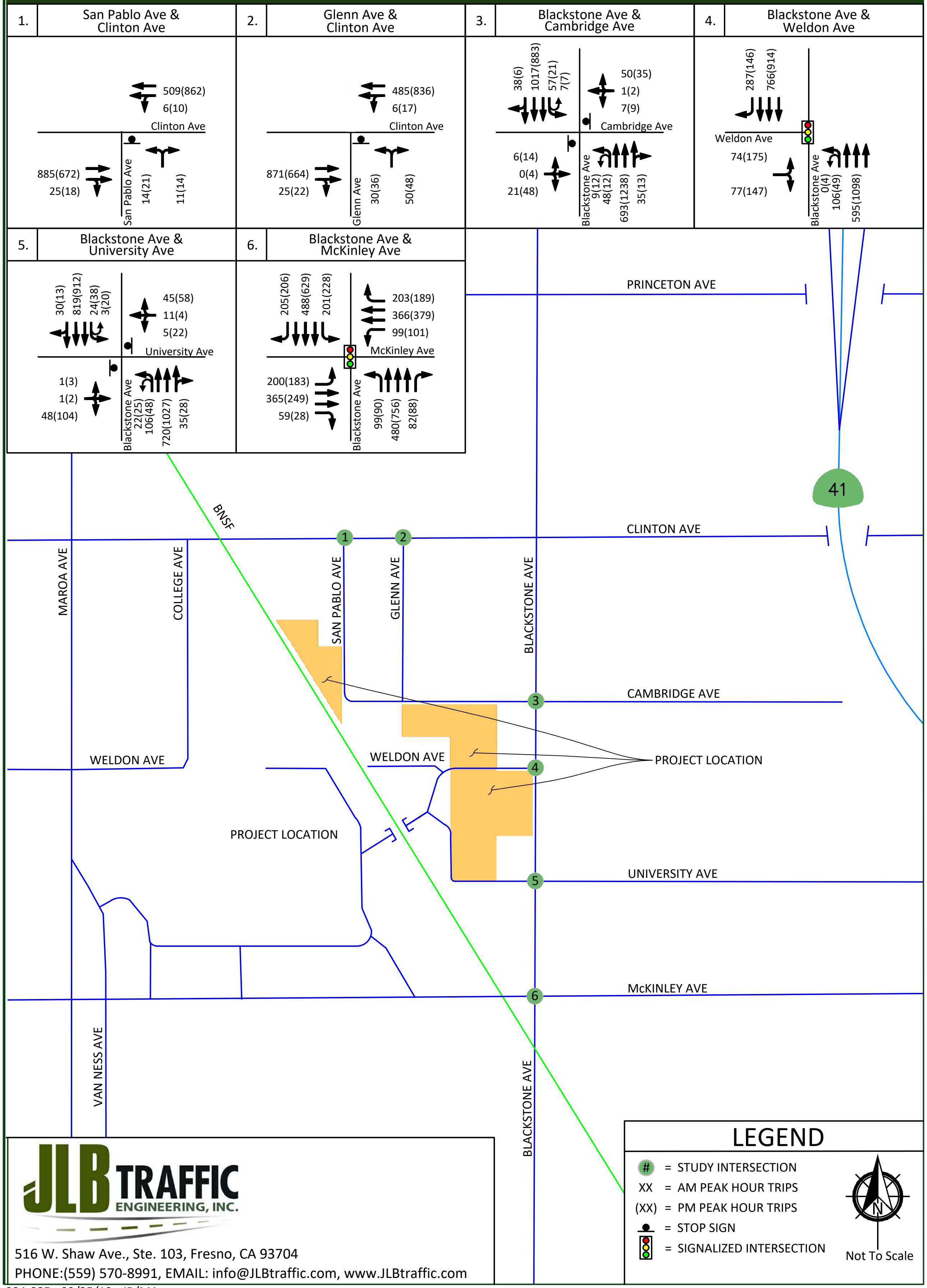
FCC Parking and Facilities Expansion - City of Fresno
Existing - Traffic Volumes, Geometrics and Controls

Figure 2



Existing plus Project Traffic Conditions

Project Description

The Parking and Facilities Expansion of the FCC campus Project consists of the following facilities:

a) Construction of a parking structure on the south side of Cambridge Avenue west of Blackstone Avenue located north of the existing district office building. The proposed parking structure would have a capacity for up to 1,000 parking spaces, include up to five levels of parking, and include ingress/egress points at Weldon Avenue, the Glenn Avenue southerly extension and potentially Cambridge Avenue.
b) Construction of a three-story Science Building approximately 95,000 square-foot located near the southwest corner of Blackstone Avenue and Weldon Avenue. The new Science Building is proposed to include six (6) biology labs, three (3) anatomy and physiology labs, five (5) chemistry labs, two (2) physics labs, two (2) engineering labs, a computer lab, three (3) general educational classrooms, four (4) Design Science (Middle College) classrooms, a welcome center, tutorial space, and 34 faculty offices. Surface parking would also be added adjacent to the building. Existing Maintenance and Operations facilities located in this area would be removed and relocated to a different area of the campus (see section d below).
c) Replacement of the existing one-story, 5,255 square-foot Child Development Center with a new one-story, 16,480 square-foot Child Development Center at its current location.
d) Construction of a one-story, 10,000 square-foot Maintenance and Operations building plus a parking and storage area on the west side of San Pablo Avenue northwest of the existing Health Sciences Building.
e) Repurposing of the existing District administration building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department.

Development of the Project facilities would occur over the next five (5) years. Per information provided to JLB, the Project is consistent with the City of Fresno 2035 General Plan. Figure 3 illustrates the latest Project Site Plan.

Project Access

Based on the latest Project details, access to and from the Project site will be off of a) Blackstone Avenue via Cambridge Avenue, Weldon Avenue and University Avenue and b) Clinton Avenue via San Pablo Avenue and Glenn Avenue.

Trip Generation

Trip generation rates for the existing and proposed Project were obtained from the 10th Edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE) and data provided from the District. Table II presents the trip generation for the Existing Project with trip generation rates for Junior/Community College (Science Building), Day Care Center (Child Development Center), Maintenance and Operations, School District Office (Administration), and Government Office Building (Police Department). At present, the Project is estimated to generate a maximum of 2,045 daily trips, 262 AM peak hour trips and 237 PM peak hour trips. However, the trip generation of the Project will differ as a result of the relocation, expansion and modification of the Project's land uses. Table III presents the trip generation for the proposed Future Project with trip generation rates for Junior/Community College (Science Building), Day Care Center (Child Development Center), Maintenance and Operations, School District Office (Administration), and Government Office Building (Police Department). At buildout, the proposed Future Project is estimated to generate a maximum of 2,230 daily trips, 287 AM peak hour trips and 268 PM peak hour trips. Compared to the Existing Project Trip Generation, the Future Project Trip Generation is estimated to be slightly higher by 185 daily trips, 25 AM peak hour trips, and 31 PM peak hour trips.

Table II: Existing Project Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM (7-9) Peak Hour*						*PM (4-6) Peak Hour*					
			Rate	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*
Junior/Community College (540)	980	students	1.15	1,127	0.11	81	19	87	21	108	0.11	56	44	60	48	108
Day Care Center (565)	77	students	4.09	315	0.78	53	47	32	28	60	0.79	47	53	29	32	61
Maintenance and Operations	30	employees	2.52	76	0.38	50	50	6	5	11	0.08	50	50	1	1	2
School District Office (538)	70	employees	5.08	356	0.83	76	24	44	14	58	0.72	17	83	9	41	50
Government Office Building (730) *	23	employees	7.45	171	1.10	75	25	19	6	25	0.71	20	80	3	13	16
Existing Project Trips				**2,045**				**188**	**74**	**262**				**102**	**135**	**237**

Note: * = ITE does not include trip generation rates for Police Department use. Trip generation rates used here are those for Government Office Building use.

Table III: Future Project Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM (7-9) Peak Hour						PM (4-6) Peak Hour					
			Rate	Total	Trip Rate	In %	Out %	In	Out	Total	Trip Rate	In %	Out %	In	Out	Total
Junior/Community College (540)	1110	students	1.15	1,277	0.11	81	19	99	23	122	0.11	56	44	68	54	122
Day Care Center (565)	119	students	4.09	487	0.78	53	47	49	44	93	0.79	47	53	44	50	94
Maintenance and Operations	22	employees	2.52	56	0.38	50	50	4	4	8	0.08	50	50	1	1	2
School District Office (538)	47	employees	5.08	239	0.83	76	24	30	9	39	0.72	17	83	6	28	34
Government Office Building (730) *	23	employees	7.45	171	1.10	75	25	19	6	25	0.71	20	80	3	13	16
Future Project Trips				**2,230**				**201**	**86**	**287**				**122**	**146**	**268**

Note: * = ITE does not include trip generation rates for Police Department use. Trip generation rates used here are those for Government Office Building use.

Table IV: Difference in Trip Generation

	Daily	AM (7-9) Peak Hour			PM (4-6) Peak Hour		
	Total	In	Out	Total	In	Out	Total
Existing Project Trip Generation	2,045	188	74	262	102	135	237
Future Project Trip Generations	2,230	201	86	287	122	146	268
Difference in Trip Generation	**185**	**13**	**12**	**25**	**20**	**11**	**31**

Trip Distribution

The trip distribution assumptions for the Existing Project were developed based on existing travel patterns, the Fresno COG Project Select Zones, the existing roadway network, engineering judgment, data provided by the District, knowledge of the study area, existing residential and commercial densities, and the City of Fresno 2035 General Plan Circulation Element in the vicinity of the Project. The trip distribution assumptions for the Future Project were developed based on existing travel patterns, the Fresno COG Project Select Zones, the existing roadway network, engineering judgment, data provided by the District, knowledge of the study area, existing residential and commercial densities, and the City of Fresno 2035 General Plan Circulation Element in the vicinity of the Project. Figure 4 illustrates the Existing Project Only Trips to the study intersections, Figure 5 illustrates the Future Project Only Trips to the study intersections, and Figure 6 illustrates the Net New Project Only Trips to the study intersections.

Bikeways

Currently, Class II Bike Lanes exist in the vicinity of the proposed Project site along McKinley Avenue. The City of Fresno "Active Transportation Plan" recommends that Class II Bike Lanes be implemented on: 1) Clinton Avenue through the City of Fresno and 2) McKinley Avenue through the City of Fresno. Additionally, the City of Fresno "Active Transportation Plan" recommends that Class I Bike Routes be implemented on: 1) Glenn Avenue between Clinton Avenue and Weldon Avenue, 2) Cambridge Avenue between San Pablo Avenue and Clark Street and 3) Weldon Avenue west of Glenn Avenue. Therefore, it is recommended that the Project implement Class I Bike Routes along a) Glenn Avenue within the Project site, b) along the Project's frontage to Cambridge Avenue (between San Pablo Avenue and Blackstone Avenue) and c) Weldon Avenue within the Project site.

Walkways

Currently, walkways exist in the vicinity of the proposed Project site along San Pablo Avenue, Glenn Avenue, Blackstone Avenue, Clinton Avenue, Cambridge Avenue, Weldon Avenue, University Avenue and McKinley Avenue. The City of Fresno "Active Transportation Plan" recommends that walkways be implemented on: 1) San Pablo Avenue, 2) Glenn Avenue, 3) Blackstone Avenue, 4) Clinton Avenue, 5) Cambridge Avenue, 6) University Avenue and 7) McKinley Avenue. Furthermore, the City of Fresno "Active Transportation Plan" recognizes that Blackstone Avenue between Shaw Avenue and Divisadero Street (BRT corridor) is an area "with a well-connected, grid network of streets with a mix of uses that generate pedestrian activity, as well as streets with commercial establishments oriented toward the sidewalk and street (as opposed to auto-oriented with large parking lots in front)" (p. 138). This area also experiences some of the highest frequency of pedestrian collisions. The City of Fresno "Active Transportation Plan" presents recommendations for enhancement such as wide sidewalks, landscaping, bulb-outs, traffic calming measures, etc. Therefore, it is recommended that the Project retain the existing walkways that are in a good state and ADA compliant along its frontages to San Pablo Avenue, Blackstone Avenue, Cambridge Avenue, and Weldon Avenue. The Project shall reconstruct walkways where needed to conform to current ADA guidelines.

Transit

Fresno Area Express (FAX) is the transit operator in the City of Fresno. At present, there are five (5) FAX transit routes that operate in the vicinity of the proposed Project. These include FAX Route 1 Q Bus Rapid Transit (BRT), FAX Route 39, FAX Route 28, FAX Route 45 and FAX Route 20. Retention of the existing and expansion of future transit routes is dependent on transit ridership demand and available funding.

FAX Route 1 Q BRT runs on Blackstone Avenue adjacent to the proposed Project. Its nearest stop to the Project is located along the west side of Blackstone Avenue approximately 150 feet south of Weldon Avenue. FAX Route 1 Q BRT operates at 10-minute intervals on weekdays starting at approximately 6:00 AM and ending at 9:00 AM, 15-minute intervals starting at approximately 9:00 AM and ending at approximately 2:35 PM, and 10-minute intervals starting at approximately 2:35 PM and ending at 7:00 PM. This route provides a direct connection to various destinations located along Blackstone Avenue and Ventura Avenue/Kings Canyon Road.

FAX Route 39 runs on Clinton Avenue approximately 0.14 miles north of the proposed Project. Its nearest stop to the Project is located along the south side of Clinton Avenue approximately 25 feet west of San Pablo Avenue. FAX Route 39 operates at 30-minute intervals on weekdays and weekends and provides a direct connection to Fresno High School, Fresno City College, Veterans Medical Center, Art Museum, Cedar/Clinton Library, Alliant University and the Fresno Yosemite International Air Terminal.

FAX Route 28 runs on Van Ness Avenue/Maroa Avenue approximately 0.40 miles east of the proposed Project. Its nearest stop to the Project is located along the east side of Maroa Avenue approximately 40 feet south of Weldon Avenue. FAX Route 28 operates at 20-minute intervals on weekdays and weekends and provides a direct connection to Fashion Fair Shopping Center, Fresno State University, Savemart Center, Manchester Center, Fresno City College, Fresno High, Community Regional Medical Center, Convention Center, Chukchansi Park, and Chandler Downtown Airport.

FAX Route 45 runs on Van Ness Avenue/Maroa Avenue approximately 0.40 miles east of the proposed Project. Its nearest stop to the Project is located along the east side of Maroa Avenue approximately 40 feet south of Weldon Avenue. FAX Route 45 operates at 60-minute intervals on weekdays and weekends and provides a direct connection to Bullard High School, Gillis Library, Fresno High School, Fresno City College, Manchester Transit Center and Army Navy Reserve.

FAX Route 20 runs on Blackstone Avenue approximately 0.26 miles south of the proposed Project. Its nearest stop to the Project is located along the west side of Blackstone Avenue approximately 150 feet south of McKinley Avenue. FAX Route 20 operates at 30-minute intervals on weekdays and weekends and provides a direct connection to Lions Park, Fresno High School, Fresno City College, Talking Book Library, Community Center, Cesar E. Chavez Adult School, Fresno Community Hospital and Convention Center.

It is worth noting that the recent implementation of the BRT system has provided for shelters at the intersection of Blackstone Avenue and Weldon Avenue, thus improving conditions for patrons. An observation made by JLB noted that the number of transit users in the vicinity of FCC is relatively high. Where possible, consideration should be given to the planting of trees to provide shade and help reduce heat during the summer months. Additionally, it is recommended that the District work with FAX to improve headways of the existing transit routes serving the FCC campus.

Vehicle Miles Traveled Evaluation

Senate Bill (SB) 743 (Steinberg 2013) was approved by then Governor Brown on September 27, 2013. SB 743 created a path to revise the definition of transportation impacts according to CEQA. The revised CEQA Guidelines requiring VMT analysis became effective December 28, 2018; however, agencies have until July 1, 2020 to finalize their local guidelines on VMT analysis. Therefore, as agencies finalize their VMT analysis protocol, CEQA transportation impacts are to be determined using LOS of intersections and roadways, which is a measure of congestion. The intent of SB 743 is to align CEQA transportation study methodology with and promote the statewide goals and policies of reducing vehicle miles traveled (VMT) and greenhouse gases (GHG). Three objectives of SB 743 related to development are to reduce GHG, diversify land uses, and focus on creating a multimodal environment. It is hoped that this will spur infill development.

The Technical Advisory on Evaluating Transportation Impacts in CEQA published by the Governor's Office of Planning and Research (OPR) dated December 2018 acknowledges that lead agencies should set criteria and thresholds for VMT and transportation impacts. However, the Technical Advisory provides guidance to residential, office and retail uses, citing these as the most common land uses. Beyond these three land uses, there is no guidance provided for any other land use type. The Technical Advisory also notes that land uses may have a less than significant impact if located within low VMT areas of a region. Screening maps are suggested for this determination.

VMT is simply the product of a number of trips and the length of those trips. The first step in a VMT analysis is to establish the baseline average VMT, which requires the definition of a region. The Technical Advisory states that existing VMT may be measured at the regional or city level. On the contrary, the Technical Advisory also notes that VMT analyses should not be truncated due to "jurisdictional or other boundaries."

As the Project will be used to serve an existing student and employee population, it is likely that the Project would not add VMT per capita. Additionally, the Project site is located near transit services and pedestrian and bicycle networks. Currently, Fresno COG and its member agencies, which include the City of Fresno, have begun the process to develop recommended criteria and thresholds that balance the direction from OPR and the goals of SB 743 with the vision of Fresno and economic development, access to goods and services, and overall quality of life. However, these regional recommended criteria are not anticipated to be completed until mid-2020.

Parking Demand

JLB prepared a Traffic and Parking Analysis Report for the SCCCD Master Plan Update (dated October 4, 2018) hereinafter referred to the Master Plan Update Report. The Master Plan Update Report found there is a grand total of 3,349 parking stalls, of which 152 spaces are on-street parking stalls adjacent to the campus, leaving a total of 3,197 on-site parking stalls (3,349 parking stalls - 152 on-street parking stalls = 3,197 on-site parking stalls). Of the 3,197 on-site parking stalls, 2,304 spaces are for the general public, 84 spaces are metered, 638 spaces are for staff, 101 spaces are ADA, 53 spaces are for motorcycles, 15 spaces are time-restricted and two (2) are other. Furthermore, the Master Plan Update Report determined that the number of general public and metered on-site parking stalls needed to meet the 2018 demand is 2,629 (2,497 general public, metered and off-site parking stalls occupied during the peak hour ÷ 95 percent occupancy rate = 2,629). This equates to a 2018 shortage of 241 general public and metered parking stalls (2,388 general public and metered parking stalls available - 2,629 general public and metered parking stalls needed to meet demand = 241 shortage). Lastly, the Master Plan Update Report determined that the number of general public and metered on-site parking stalls needed to meet the 2028 demand is 2,709. This equates to a 2028 shortage of 321 general public and metered parking stalls.

The portion of the Project that is the parking structure is anticipated to add a total of 1,000 parking spaces, while replacing 189 parking stalls. Therefore, the net change is 811 parking stalls (1,000 new parking stalls - 189 existing parking stalls = 811 net new parking stalls). Given that the current number of general public and metered on-site parking stalls is 2,388 and the Project will add 811 general public parking stalls, the new total of general public and metered on-site parking stalls will be 3,199 parking stalls. Since the parking supply is projected to be up to 3,199 general public and metered on-site parking stalls, it is anticipated that the FCC campus will have sufficient parking supply to accommodate the projected parking demand in the year 2028.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Existing plus Project Traffic Conditions scenario. These warrants are found in Appendix K. The effects of right-turning traffic from the minor approach onto the major approach were taken into account using engineering judgement pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized study intersections are projected to satisfy the peak hour signal warrant during either peak period.

Results of Existing plus Project Level of Service Analysis

The Existing plus Project Traffic Conditions scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing Traffic Conditions scenario. Figure 7 illustrates the Existing plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Existing plus Project Traffic Conditions scenario are provided in Appendix F. Table V presents a summary of the Existing plus Project peak hour LOS at the study intersections.

Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.

- Blackstone Avenue / Cambridge Avenue
  - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.
  - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.
- Blackstone Avenue / University Avenue
  - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.

- Blackstone Avenue / Weldon Avenue
  - Add a southbound U-turn-turn lane;
  - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
  - Modify the traffic signal to accommodate the added lane.

Table V: Existing plus Project Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*AM (7-9) Peak Hour*		*PM (4-6) Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	San Pablo Avenue / Clinton Avenue	One-Way Stop	37.2	E	25.2	D
2	Glenn Avenue / Clinton Avenue	One-Way Stop	33.1	D	30.1	D
3	Blackstone Avenue / Cambridge Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Mitigated)	20.1	C	19.1	C
4	Blackstone Avenue / Weldon Avenue	Signalized	15.8	B	13.0	B
		Signalized (Mitigated)	18.2	B	15.8	B
5	Blackstone Avenue / University Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Mitigated)	16.7	C	20.9	C
6	Blackstone Avenue / McKinley Avenue	Signalized	37.3	D	35.0	D

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.

FCC Parking and Facilities Expansion - City of Fresno
Project Cite Plan

Figure 3

JLB TRAFFIC ENGINEERING, INC.
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

Not To Scale

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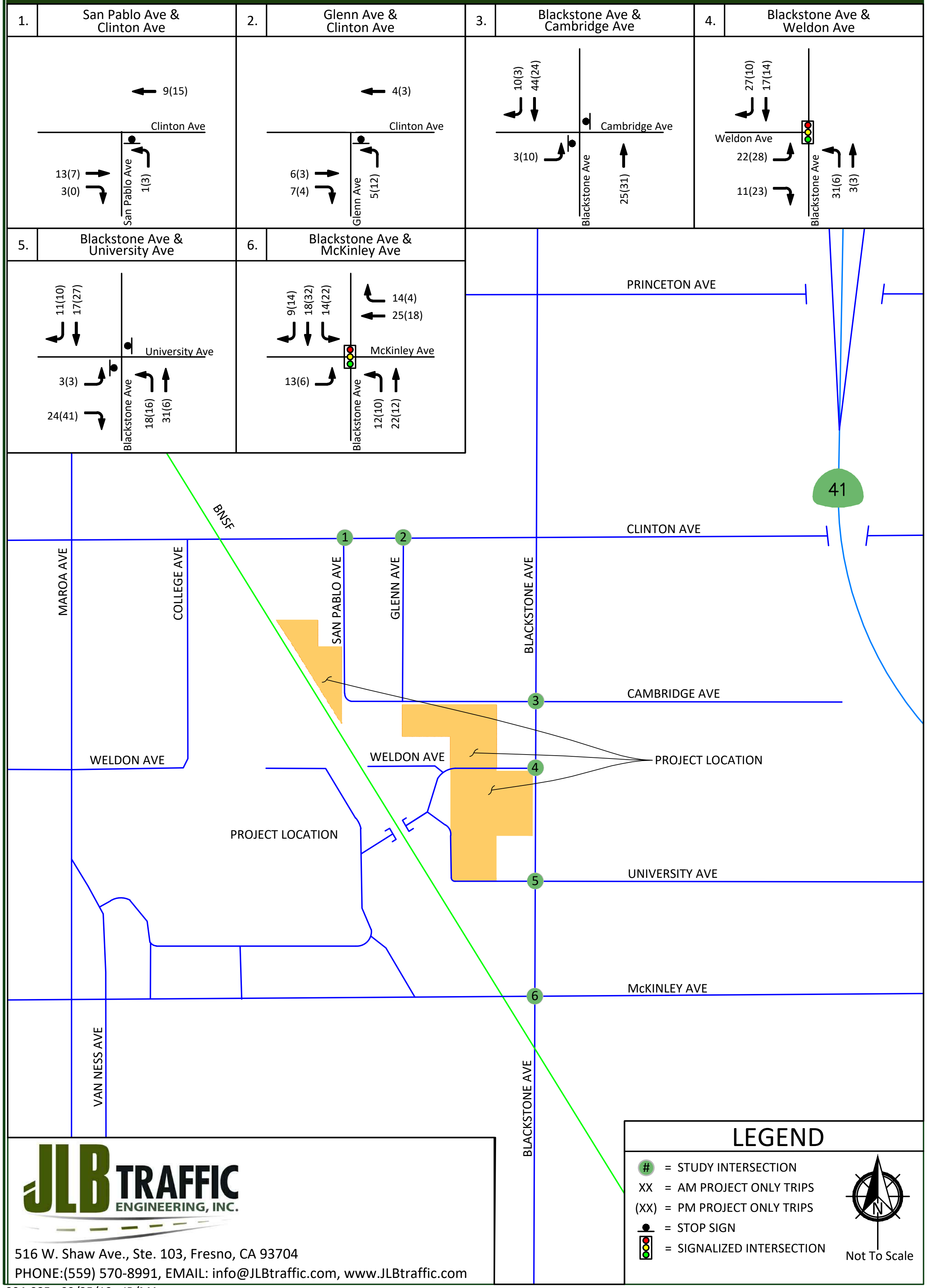
FCC Parking and Facilities Expansion - City of Fresno
Existing Project Only Trips

Figure 4



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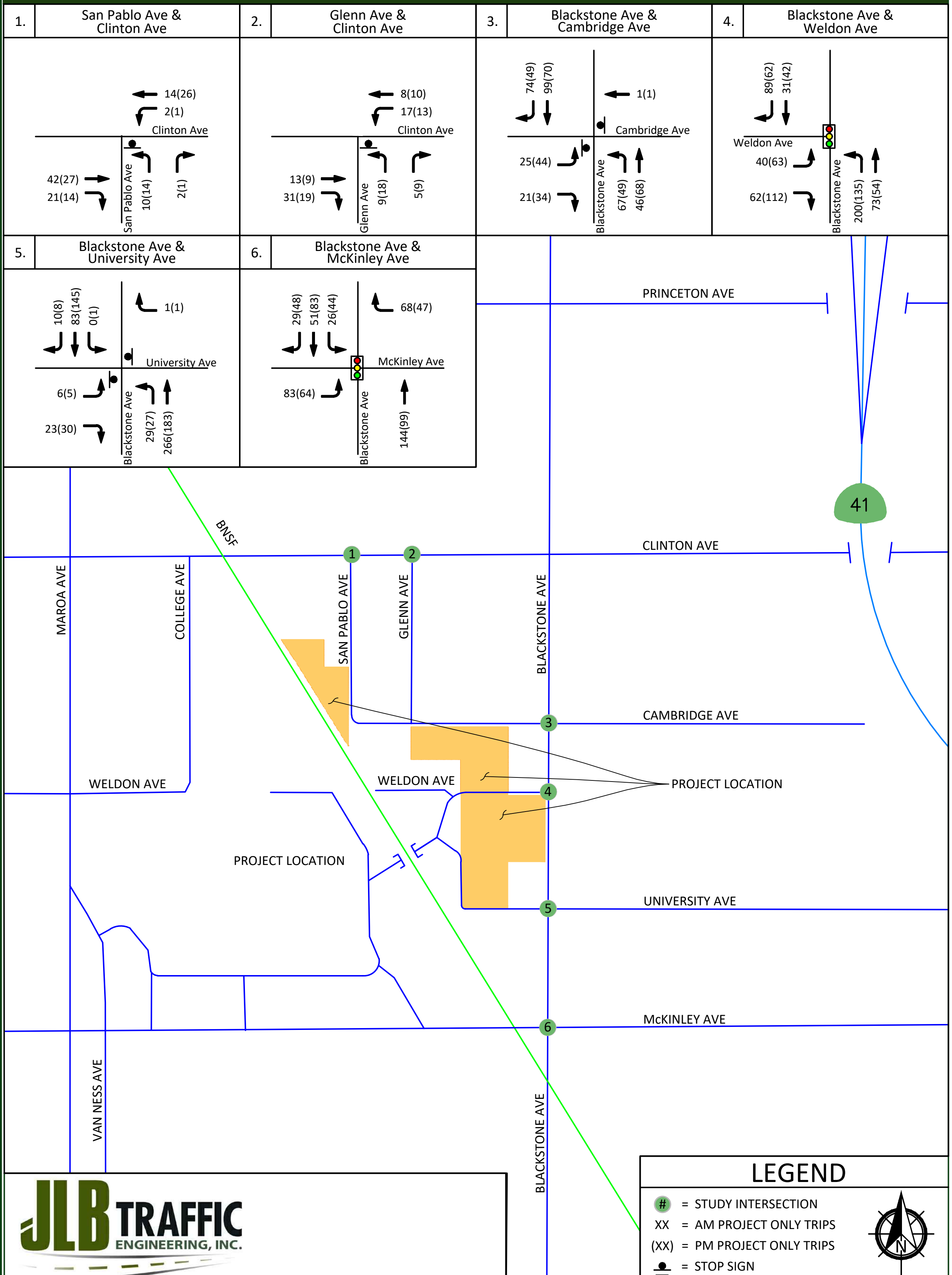
FCC Parking and Facilities Expansion - City of Fresno
Future Project Only Trips

Figure 5



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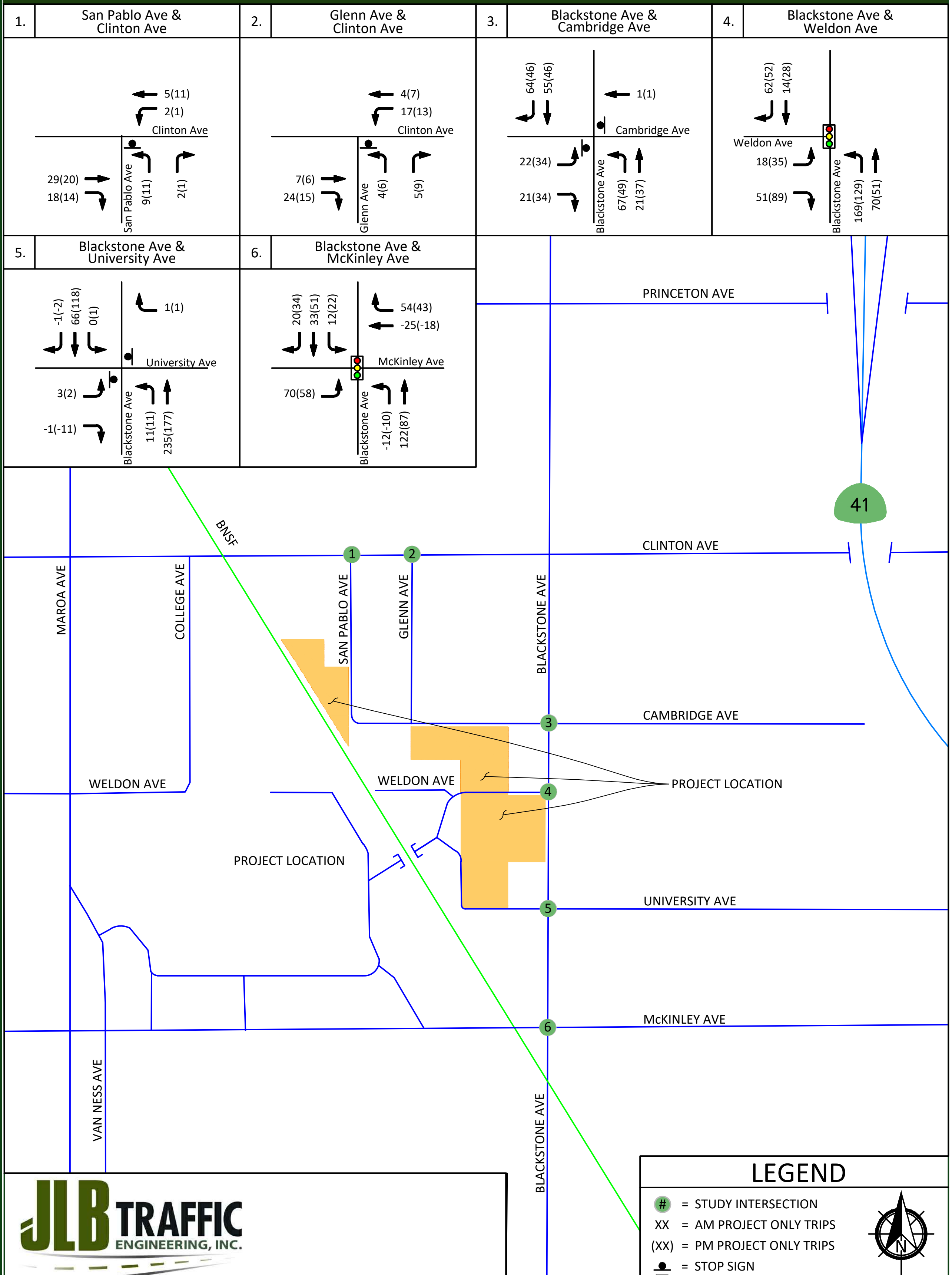
FCC Parking and Facilities Expansion - City of Fresno
Net New Project Only Trips

Figure 6



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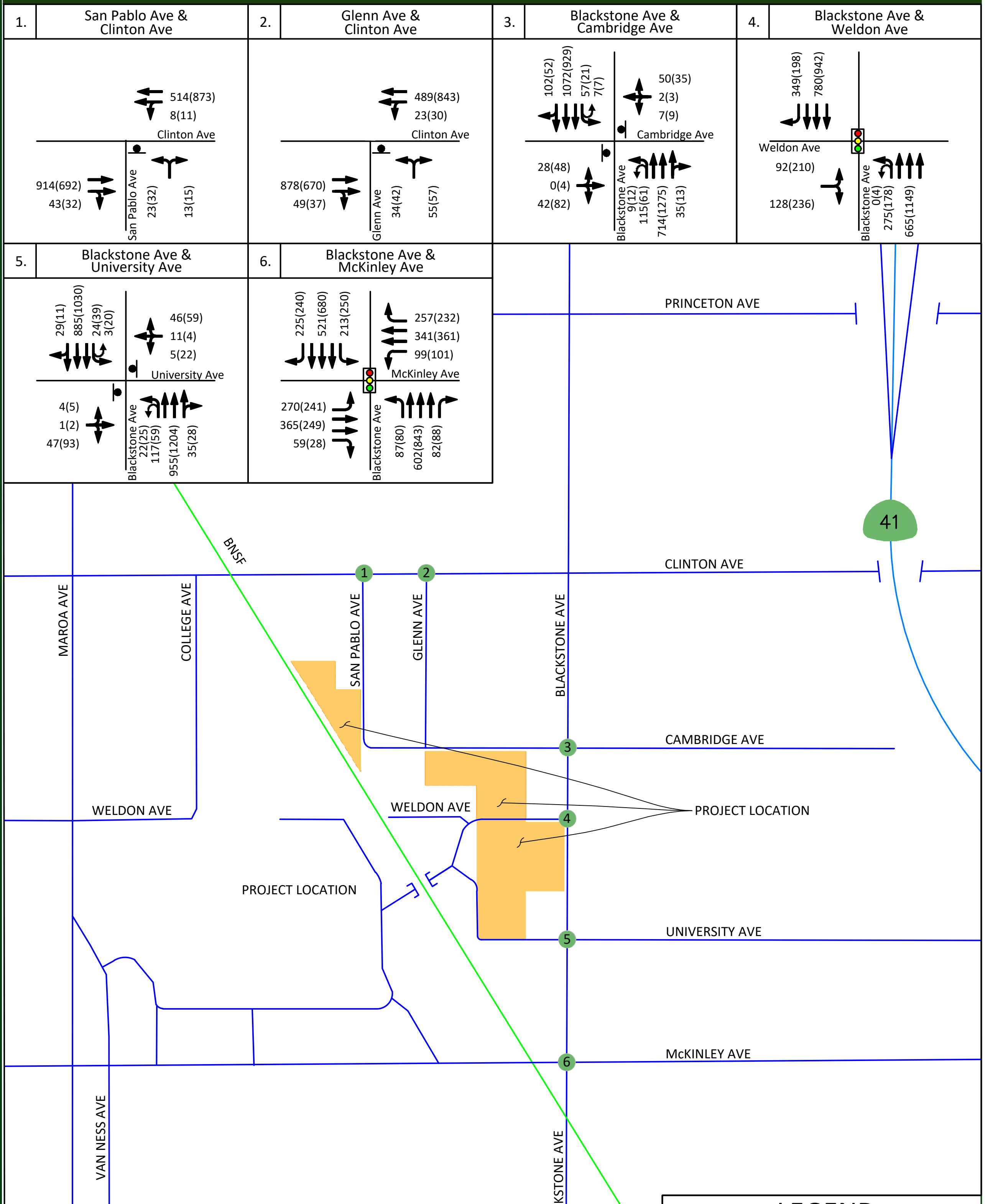
FCC Parking and Facilities Expansion - City of Fresno
Existing plus Project - Traffic Volumes, Geometrics and Controls

Figure 7



LEGEND

- # = STUDY INTERSECTION
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- = STOP SIGN
- = SIGNALIZED INTERSECTION

Not To Scale

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PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue

JLB conducted an analysis of the Existing plus Project scenario in which the Parking Structure component of the proposed Project does not have direct access to Cambridge Avenue.

Results of Existing plus Project Level of Service Analysis - No Parking Structure Access to Cambridge Avenue

The Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing Traffic Conditions scenario. LOS worksheets for the Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue scenario are provided in Appendix G. Table VI presents a summary of the Existing plus Project peak hour LOS at the study intersections.

Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.

- Blackstone Avenue / Cambridge Avenue
  - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.
  - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.

- Blackstone Avenue / University Avenue
  - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.

- Blackstone Avenue / Weldon Avenue
  - Add a southbound U-turn-turn lane;
  - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
  - Modify the traffic signal to accommodate the added lane.

When compared to the Existing plus Project Traffic Condition scenario, the prevention of the Parking Structure's access to Cambridge Avenue will encourage most southbound traffic on Blackstone Avenue and all northbound traffic on Blackstone Avenue to enter the site via Weldon Avenue, thus reducing traffic on Cambridge Avenue between Glenn Avenue and Blackstone Avenue. As can be seen from Tables V and VI, the prevention of the Parking Structure's access to Cambridge Avenue is projected to slightly improve the LOS at the intersection of Blackstone Avenue and Cambridge Avenue while the LOS at the intersection of Blackstone Avenue and Weldon Avenue is projected to slightly worsen. More specifically, the LOS at the intersection of Blackstone Avenue and Cambridge Avenue is projected to reduce from greater than 120.0 seconds during both peak periods under the Existing plus Project Traffic Conditions scenario to 111.2 seconds during the AM peak period and 117.8 seconds during the PM peak period under the Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue. Moreover the LOS at the intersection of Blackstone Avenue and Cambridge Avenue is projected to increase from 15.8 seconds during the AM peak period and 13.0 seconds during the PM peak period under the Existing plus Project Traffic Conditions scenario to 18.6 seconds during the AM peak period and 14.4 seconds during the PM peak period under the Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue.

Table VI: Existing plus Project Intersection LOS Results - No Parking Structure Access to Cambridge Avenue

ID	Intersection	Intersection Control	AM (7-9) Peak Hour		PM (4-6) Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	San Pablo Avenue / Clinton Avenue	One-Way Stop	37.2	E	25.2	D
2	Glenn Avenue / Clinton Avenue	One-Way Stop	33.1	D	30.1	D
3	Blackstone Avenue / Cambridge Avenue	Two-Way Stop	**111.2**	**F**	**117.8**	**F**
		Two-Way Stop (Mitigated)	18.6	C	19.1	C
4	Blackstone Avenue / Weldon Avenue	Signalized	18.6	B	14.4	B
		Signalized (Mitigated)	18.7	B	17.0	B
5	Blackstone Avenue / University Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Mitigated)	16.7	C	20.9	C
6	Blackstone Avenue / McKinley Avenue	Signalized	37.3	D	35.0	D

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Near Term plus Project Traffic Conditions

Description of Approved and Pipeline Projects

Approved and Pipeline Projects consist of developments that are either under construction, built but not fully occupied, are not built but have final site development review (SDR) approval, or for which the lead agency or responsible agencies have knowledge of. The City of Fresno, County of Fresno and Caltrans staff were consulted throughout the preparation of this TIA regarding approved and/or known projects that could potentially impact the study intersections. JLB staff conducted a reconnaissance of the surrounding area to confirm the Near Term Projects. Subsequently, it was agreed that the project listed in Table VII was approved, near approval, or in the pipeline within the proximity of the proposed Project.

The trip generation listed in Table VII is that which is anticipated to be added to the streets and highways by this project between the time of the preparation of this report and five years from 2019. As shown in Table VII, the total trip generation for the Near Term Project is 2,132 daily trips, 171 AM peak hour trips and 150 PM peak hour trips. Figure 8 illustrates the location of the approved, near approval, or pipeline project and their combined trip assignment to the study intersections and segments under the Near Term plus Project Traffic Conditions scenario.

Table VII: Near Term Projects' Trip Generation

Approved Project Location	*Approved or Pipeline Project Name*	*Daily Trips*	*AM Peak Hour*	*PM Peak Hour*
A	Blackstone and Clinton Commercial Development[1]	1,104	111	63
B	Blackstone and McKinley Commercial Development[2]	1,028	60	87
Total Approved and Pipeline Project Trips		**2,132**	**171**	**150**

Note: 1 = Trip Generation based on Traffic Impact Analysis prepared by JLB Traffic Engineering, Inc.
1 = Trip Generation prepared by JLB Traffic Engineering, Inc. based on readily available information

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Near Term plus Project Traffic Conditions scenario. These warrants are found in Appendix K. The effects of right-turning traffic from the minor approach onto the major approach were taken into account using engineering judgement pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized study intersections are projected to satisfy the peak hour signal warrant during either peak period.

Results of Near Term plus Project Level of Service Analysis

The Near Term plus Project Traffic Conditions scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing Traffic Conditions scenario. Figure 9 illustrates the Near Term plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Near Term plus Project Traffic Conditions scenario are provided in Appendix H. Table VIII presents a summary of the Near Term plus Project peak hour LOS at the study intersections.

Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.

- Blackstone Avenue / Cambridge Avenue
    - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.
    - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.
- Blackstone Avenue / University Avenue
    - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.

- Blackstone Avenue / Weldon Avenue
    - Add a southbound U-turn-turn lane;
    - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
    - Modify the traffic signal to accommodate the added lane.

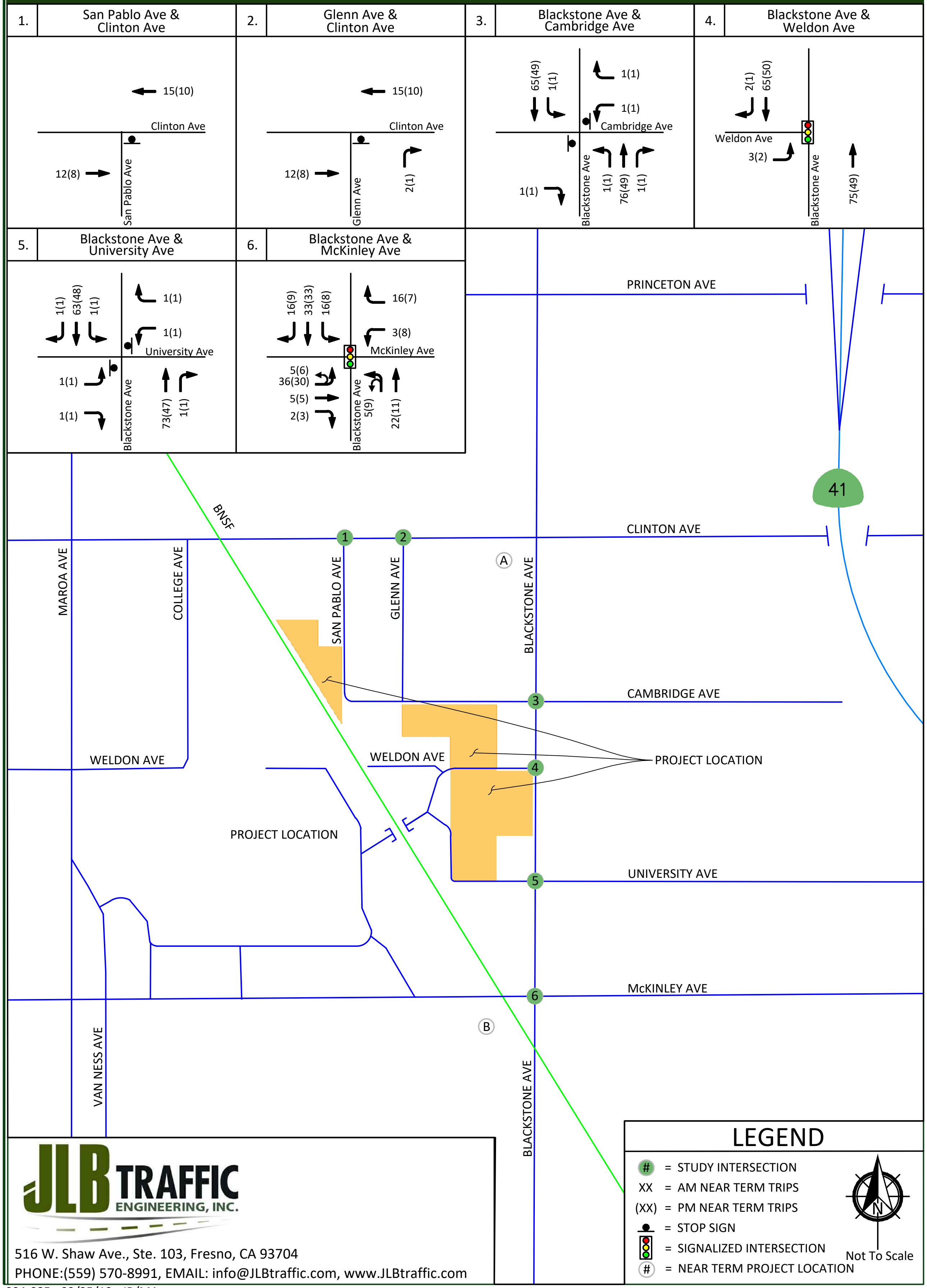
Table VIII: Near Term plus Project Intersection LOS Results

ID	Intersection	Intersection Control	AM (7-9) Peak Hour		PM (4-6) Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	San Pablo Avenue / Clinton Avenue	One-Way Stop	38.6	E	25.7	D
2	Glenn Avenue / Clinton Avenue	One-Way Stop	34.2	D	30.8	D
3	Blackstone Avenue / Cambridge Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Mitigated)	21.5	C	19.9	C
4	Blackstone Avenue / Weldon Avenue	Signalized	16.0	B	13.0	B
		Signalized (Mitigated)	20.3	C	16.5	B
5	Blackstone Avenue / University Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Mitigated)	17.9	C	22.1	C
6	Blackstone Avenue / McKinley Avenue	Signalized	40.5	D	37.9	D

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.

FCC Parking and Facilities Expansion - City of Fresno — Figure 8

Near Term Projects' Trip Assignment

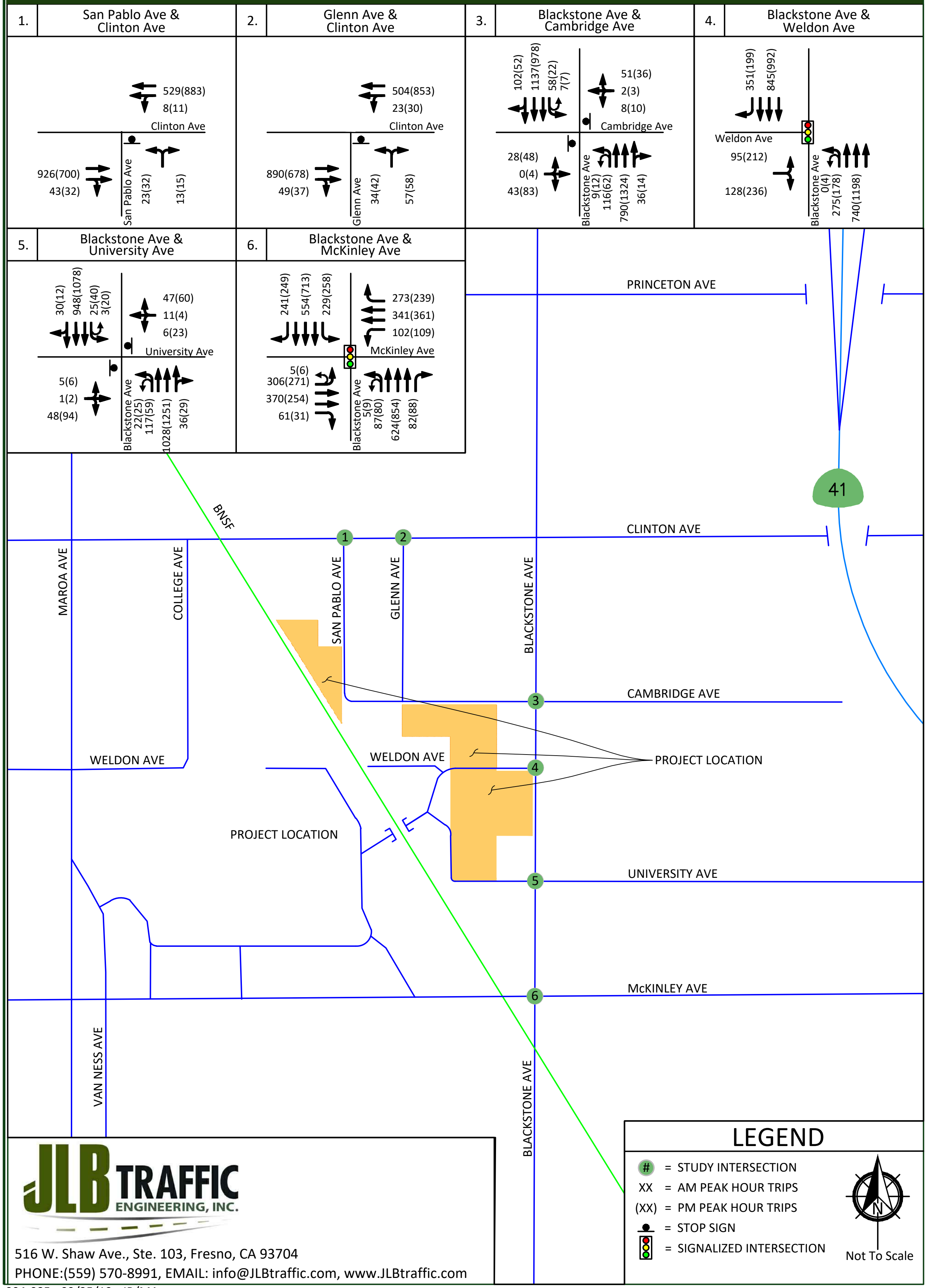


JLB TRAFFIC ENGINEERING, INC.
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

FCC Parking and Facilities Expansion - City of Fresno

Figure 9

Near Term plus Project - Traffic Volumes, Geometrics and Controls



JLB TRAFFIC ENGINEERING, INC.

516 W. Shaw Ave., Ste. 103, Fresno, CA 93704

PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

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Cumulative Year 2035 No Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Cumulative Year 2035 No Project Traffic Conditions scenario. These warrants are found in Appendix K. The effects of right-turning traffic from the minor approach onto the major approach were taken into account using engineering judgement pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized study intersections are projected to satisfy the peak hour signal warrant during either peak period.

Results of Cumulative Year 2035 No Project Level of Service Analysis

The Cumulative Year 2035 No Project Traffic Conditions scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing Traffic Conditions scenario with one exception. The exception is that the southbound left-turn pocket at Blackstone Avenue and Peralta Way will be blocked as part of the City of Fresno Grade Separation of both McKinley Avenue and Blackstone Avenue from the BNSF Railway Tracks. Figure 10 illustrates the Cumulative Year 2035 No Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Cumulative Year 2035 plus Project Traffic Conditions scenario are provided in Appendix I. Table IX presents a summary of the Cumulative Year 2035 No Project peak hour LOS at the study intersections.

Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.

- Blackstone Avenue / Cambridge Avenue
    - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.
    - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.

- Blackstone Avenue / University Avenue
  - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and McKinley Avenue, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.

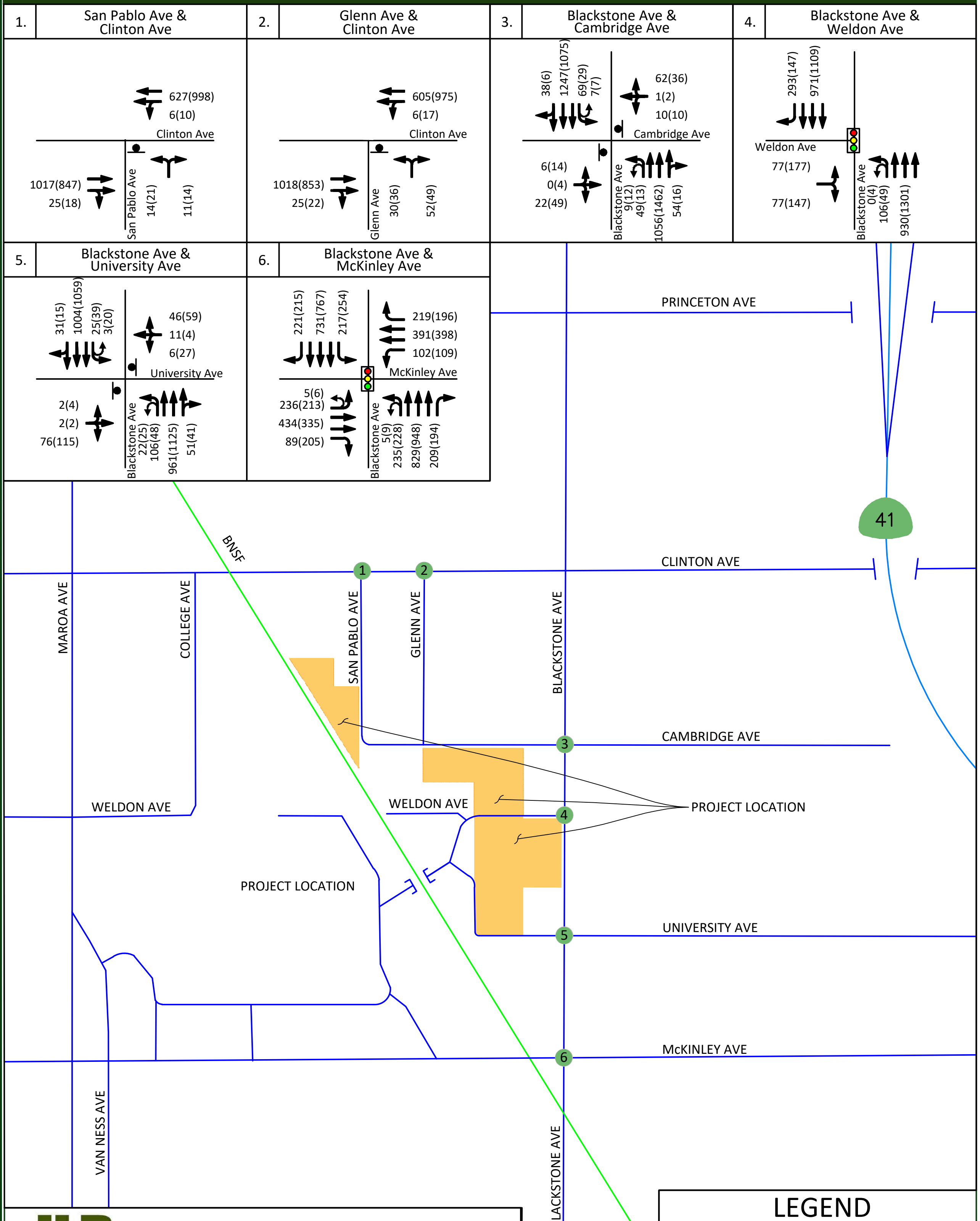
- Blackstone Avenue / Weldon Avenue
  - Add a southbound U-turn-turn lane;
  - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
  - Modify the traffic signal to accommodate the added lane.

Table IX: Cumulative Year 2035 No Project Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*AM (7-9) Peak Hour*		*PM (4-6) Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	San Pablo Avenue / Clinton Avenue	One-Way Stop	29.8	D	29.5	D
2	Glenn Avenue / Clinton Avenue	One-Way Stop	31.9	D	39.4	E
3	Blackstone Avenue / Cambridge Avenue	Two-Way Stop	**64.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Improved)	17.4	C	21.5	C
4	Blackstone Avenue / Weldon Avenue	Signalized	8.8	A	10.0	A
		Signalized (Improved)	9.9	A	13.3	B
5	Blackstone Avenue / University Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Improved)	17.0	C	19.5	C
6	Blackstone Avenue / McKinley Avenue	Signalized	36.8	D	38.2	D

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

FCC Parking and Facilities Expansion - City of Fresno — Figure 10
Cumulative Year 2035 No Project - Traffic Volumes, Geometrics and Controls



JLB TRAFFIC ENGINEERING, INC.

516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

LEGEND

- # = STUDY INTERSECTION
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- = STOP SIGN
- = SIGNALIZED INTERSECTION

N

Not To Scale

Cumulative Year 2035 plus Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Cumulative Year 2035 plus Project Traffic Conditions scenario. These warrants are found in Appendix K. The effects of right-turning traffic from the minor approach onto the major approach were taken into account using engineering judgement pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized study intersections are projected to satisfy the peak hour signal warrant during either peak period.

Results of Cumulative Year 2035 plus Project Level of Service Analysis

The Cumulative Year 2035 plus Project Traffic Conditions scenario assumes the same roadway geometrics and traffic controls as those assumed in the Existing Traffic Conditions scenario with one exception. The exception is that the southbound left-turn pocket at Blackstone Avenue and Peralta Way will be blocked as part of the City of Fresno Grade Separation of both McKinley Avenue and Blackstone Avenue from the BNSF Railway Tracks. Figure 11 illustrates the Cumulative Year 2035 plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Cumulative Year 2035 plus Project Traffic Conditions scenario are provided in Appendix J. Table X presents a summary of the Cumulative Year 2035 plus Project peak hour LOS at the study intersections.

Under this scenario, the intersections of Glenn Avenue and Clinton Avenue, Blackstone Avenue and Cambridge Avenue, and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during one or both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.

- Glenn Avenue / Clinton Avenue
    - Modify the northbound left-right lane to a left-turn lane;
    - Add a northbound right-turn lane; and
    - Eliminate curbside parking along Glenn Avenue within the limits of the proposed right-turn lane and transitions thereof. The Queuing Analysis presents the storage capacity recommendation for this movement.
- Blackstone Avenue / Cambridge Avenue
    - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.

    - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.
- Blackstone Avenue / University Avenue
    - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and McKinley Avenue, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.

- Blackstone Avenue / Weldon Avenue
    - Add a southbound U-turn-turn lane;
    - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
    - Modify the traffic signal to accommodate the added lane.

Table X: Cumulative Year 2035 plus Project Intersection LOS Results

ID	Intersection	Intersection Control	AM (7-9) Peak Hour		PM (4-6) Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	San Pablo Avenue / Clinton Avenue	One-Way Stop	38.5	E	37.4	E
2	Glenn Avenue / Clinton Avenue	One-Way Stop	40.7	E	**53.8**	**F**
		One-Way Stop (Mitigated)	31.3	D	40.1	E
3	Blackstone Avenue / Cambridge Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Mitigated)	21.8	C	22.8	C
4	Blackstone Avenue / Weldon Avenue	Signalized	12.6	B	13.6	B
		Signalized (Mitigated)	17.5	B	16.9	B
5	Blackstone Avenue / University Avenue	Two-Way Stop	**>120.0**	**F**	**>120.0**	**F**
		Two-Way Stop (Mitigated)	18.5	C	22.6	C
6	Blackstone Avenue / McKinley Avenue	Signalized	43.9	D	43.9	D

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

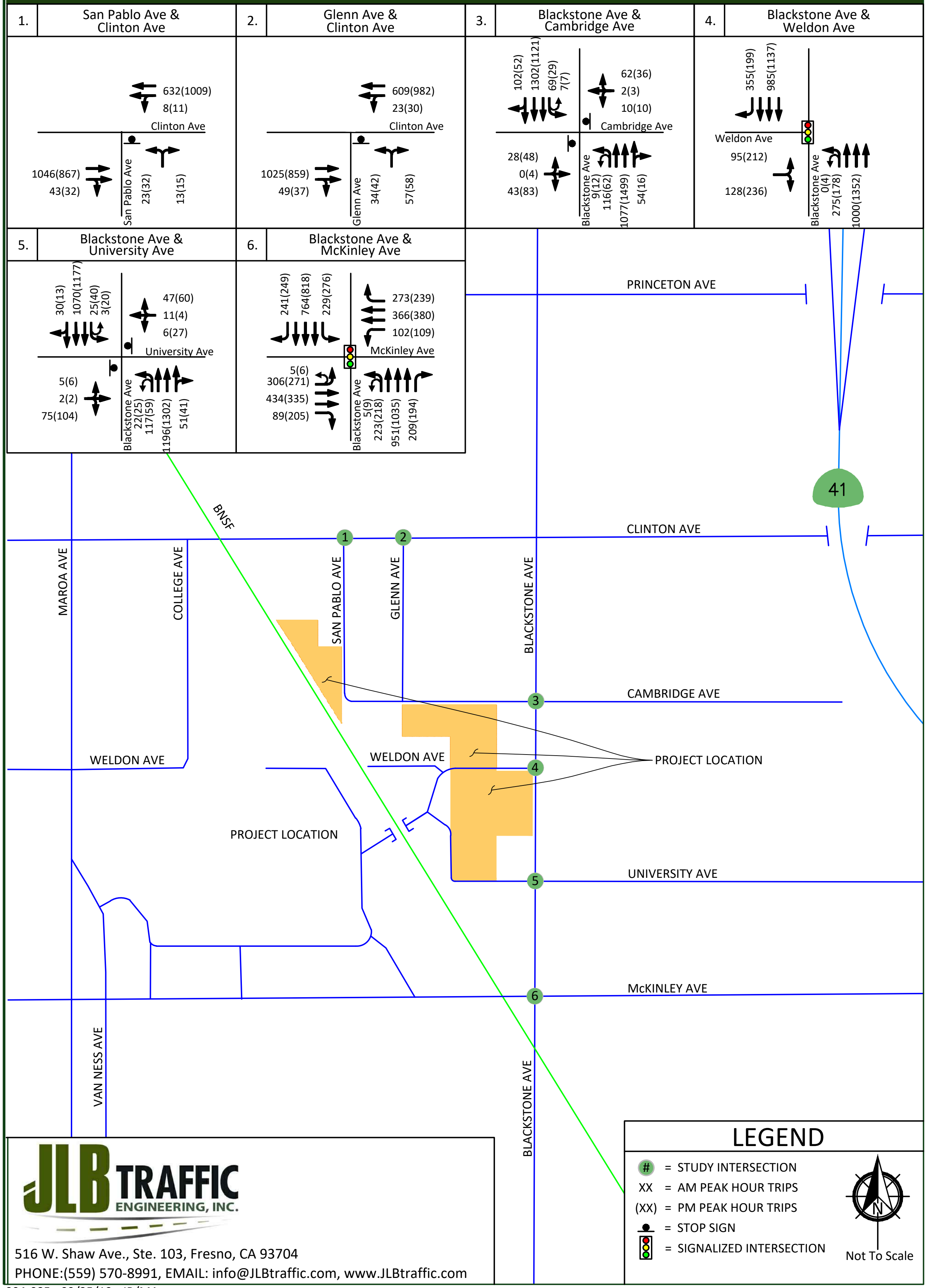
Project Only Trips to State Facilities

The Net New Project Only Trips to the interchange of State Route 41 at McKinley Avenue are illustrated in Figure 12, while the Net New Project Only Trips to the interchange of State Route 180 at Blackstone Avenue/Abby Street are illustrated in Figure 13.

FCC Parking and Facilities Expansion - City of Fresno

Figure 11

Cumulative Year 2035 plus Project - Traffic Volumes, Geometrics and Controls



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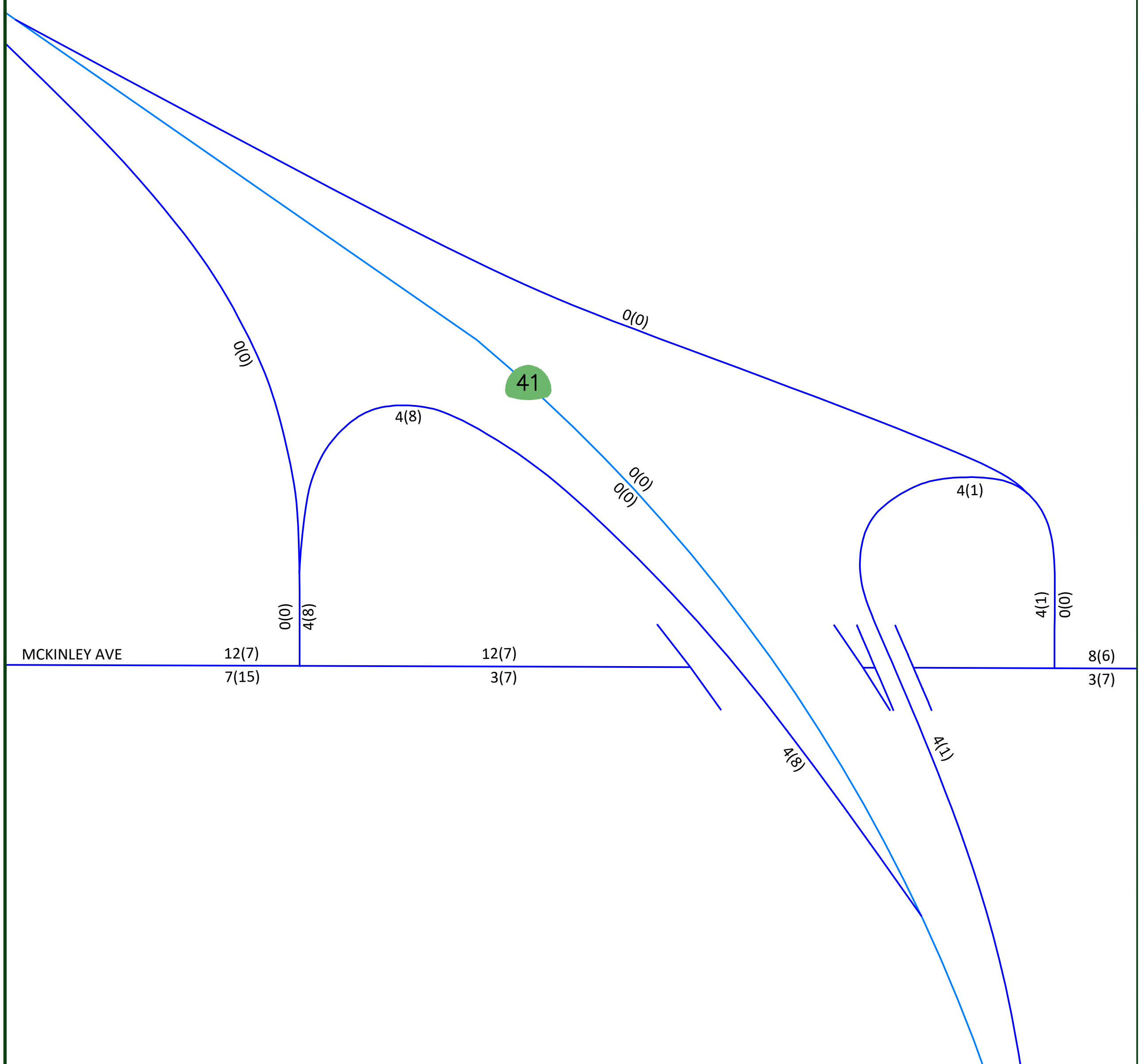
FCC Parking and Facilities Expansion - City of Fresno
State Route 41 at McKinley Avenue Interchange - Net New Project Only Trips

Figure 12



LEGEND

XX = AM PROJECT ONLY TRIPS
(XX) = PM PROJECT ONLY TRIPS

Not To Scale

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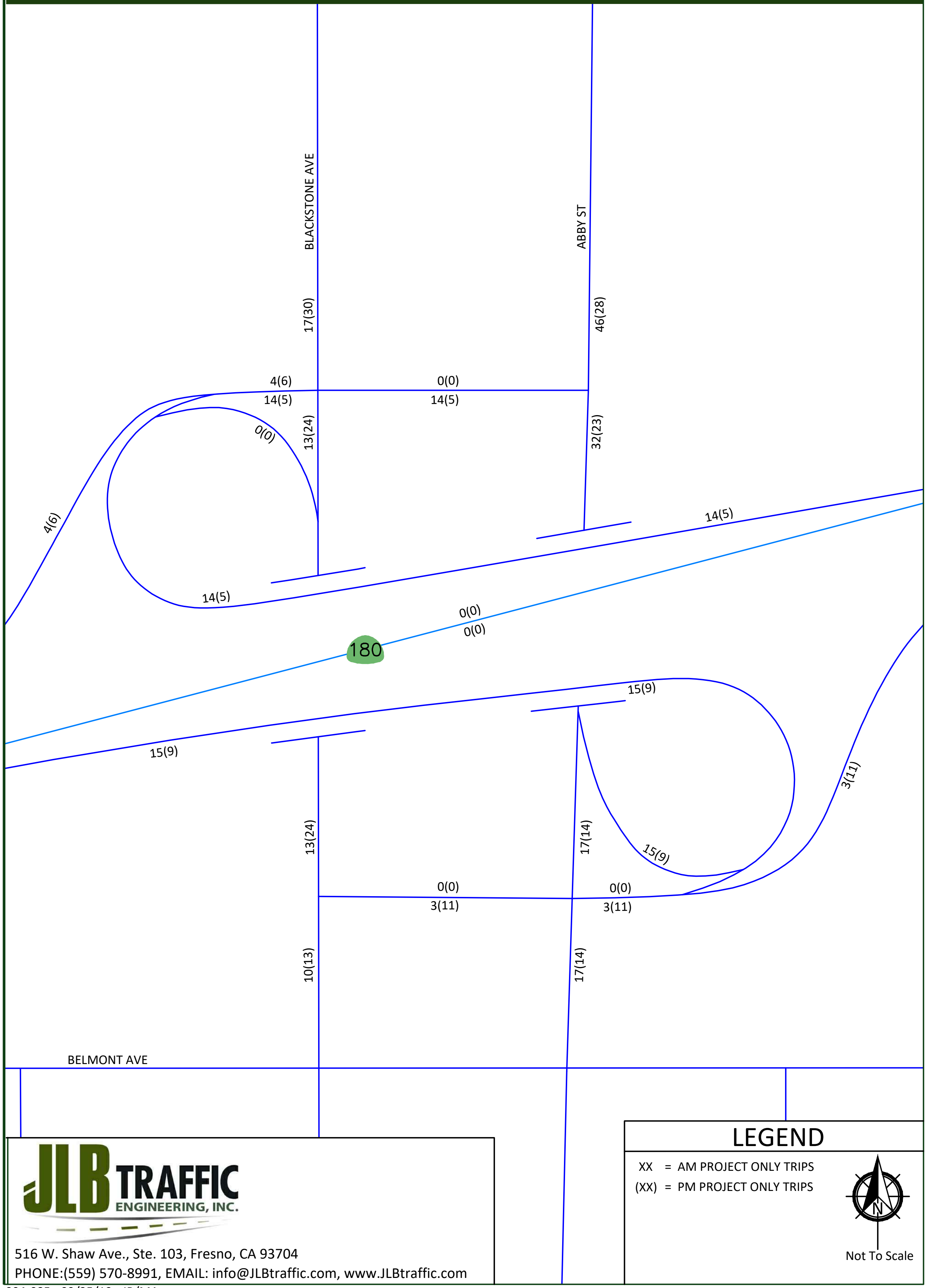
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

FCC Parking and Facilities Expansion - City of Fresno
State Route 180 at Blackstone Avenue & Abby Street Interchange - Net New Project Only Trips

Figure 13



JLB TRAFFIC ENGINEERING, INC.
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

Queuing Analysis

Table XI provides a queue length summary for left-turn and right-turn lanes at the study intersections under all study scenarios. The queuing analyses for the study intersections are contained in the LOS worksheets for the respective scenarios. Appendix D contains the methodologies used to evaluate these intersections. Queuing analyses were completed using Sim Traffic output information. Synchro provides both 50th and 95th percentile maximum queue lengths (in feet). According to the Synchro manual, "the 50th percentile maximum queue is the maximum back of queue on a typical cycle and the 95th percentile queue is the maximum back of queue with 95th percentile volumes." The queues shown on Table XI are the 95th percentile queue lengths for the respective lane movements.

The *Highway Design Manual* (HDM) provides guidance for determining deceleration lengths for the left-turn and right-turn lanes based on design speeds. Per the HDM criteria, "tapers for right-turn lanes are usually un-necessary since the main line traffic need not be shifted laterally to provide space for the right-turn lane. If, in some rare instances, a lateral shift were needed, the approach taper would use the same formula as for a left-turn lane." Therefore, a bay taper length pursuant to the Caltrans HDM would need to be added, as necessary, to the recommended storage lengths presented in Table XI.

Based on the SimTraffic output files and engineering judgement, it is recommended that the storage capacity for the following be considered for the Cumulative Year 2035 plus Project Traffic Conditions. While the City of Fresno does not have minimum storage length requirements for left-turn and right-turn lanes on major streets, it does prefer that these be set at 200 feet for left-turns and 75 feet for right-turns. At the remaining approaches of the study intersections, the greater of the existing storage capacity or the 200-foot left-turn lanes and 75-foot right-turn lanes will be sufficient to accommodate the maximum queue.

- Glenn Avenue / Clinton Avenue
  - Consider setting the storage capacity of the northbound right-turn lane to 100 feet. Doing so requires that curbside parking be prohibited along Glenn Avenue within the limits of the proposed right-turn lane and transitions thereof.
- Blackstone Avenue / Cambridge Avenue
  - The existing storage capacity of the northbound left-turn lane is projected to exceed that available during the AM peak period in the Cumulative Year 2035 plus Project Traffic Conditions scenario. However, increasing the storage capacity of this movement is not possible without impacting the recommended storage capacity of the southbound left-turn lane at Blackstone Avenue and Weldon Avenue. Therefore, this cumulative impact is considered adverse but not significant.
- Blackstone Avenue / Weldon Avenue
  - Consider increasing the storage capacity of the eastbound left-turn lane to 175 feet.
  - The storage capacity of the southbound left-turn lane is projected to be 151 feet during the PM peak period in the Cumulative Year 2035 plus Project Traffic Conditions scenario. However, a storage capacity of 150 feet for the southbound left-turn lane would require a reduction in storage capacity of the northbound left-turn lane at Blackstone Avenue and Cambridge Avenue. Therefore, it is recommended that the storage capacity of this movement be set at 100 feet.
  - Consider increasing the storage capacity of the southbound right-turn lane to 175 feet.

- Blackstone Avenue / University Avenue
  - The existing storage capacity of the northbound left-turn lane is projected to exceed that available during the AM peak period in the Cumulative Year 2035 plus Project Traffic Conditions scenario. However, increasing the storage capacity of this movement is not possible without impacting the storage capacity of the southbound left-turn lane at Blackstone Avenue and Peralta Way. Therefore, this cumulative impact is considered adverse but not significant. However, as part of the City of Fresno Grade Separation of the BNSF Railway improvements, it is recommended that the storage capacity of the northbound left-turn lane be increased to 100 feet.
- Blackstone Avenue / McKinley Avenue
  - The existing storage capacity of the eastbound left-turn lane is projected to exceed that available during both peak periods in the Cumulative Year 2035 plus Project Traffic Conditions scenario. However, increasing the storage capacity of this movement is not possible without impacting the westbound left-turn lane at the intersection of Calaveras Street and McKinley Avenue. Therefore, this cumulative impact is considered adverse but not significant.
  - Consider increasing the storage capacity of the westbound right-turn lane to 175 feet.
  - Consider increasing the storage capacity of the northbound left-turn lane to 275 feet.
  - Consider increasing the storage capacity of the southbound left-turn lane to 350 feet.
  - Consider increasing the storage capacity of the southbound right-turn lane to 225 feet.

Table XI: Queuing Analysis

ID	Intersection	Existing Queue Storage Length (ft.)		Existing		Existing plus Project		Near Term plus Project		Cumulative Year 2035 No Project		Cumulative Year 2035 plus Project	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	San Pablo Avenue / Clinton Avenue	EB Thru	>500	0	0	0	0	0	0	0	0	0	18
		EB Thru-Right	>500	0	0	0	0	0	0	0	0	0	0
		WB Left-Thru	>300	29	16	13	0	24	39	27	45	39	44
		WB Thru	>300	0	0	0	0	0	0	0	0	0	0
		NB Left-Right	>500	36	52	49	45	57	49	51	46	47	58
2	Glenn Avenue / Clinton Avenue	EB Thru	>300	15	0	17	0	23	0	18	15	10	0
		EB Thru-Right	>300	19	0	19	0	20	0	25	14	8	0
		WB Left-Thru	>500	59	63	56	24	72	57	46	75	116	64
		WB Thru	>500	0	0	10	0	0	0	10	0	81	10
		NB Left-Right	>500	60	54	75	71	74	84	73	91	*	*
		NB Left	>500	*	*	*	*	*	*	*	*	60	124
		NB Right	*	*	*	*	*	*	*	*	*	44	87
3	Blackstone Avenue / Cambridge Avenue	EB Left-Thru-Right	>300	50	88	*	*	*	*	*	*	*	*
		EB Right	>300	*	*	54	187	70	112	59	56	68	109
		WB Left-Thru-Right	>300	69	54	*	*	*	*	*	*	*	*
		WB Right	>300	*	*	52	58	50	52	59	56	59	58
		NB Left	75	67	39	103	132	154	77	62	42	180	73
		NB Thru	>300	0	0	0	124	116	0	33	0	238	0
		NB Thru	>300	0	0	0	0	9	0	0	0	208	0
		NB Thru-Right	>300	0	0	10	0	9	0	0	10	0	8
		SB Left	75	43	51	47	36	48	38	55	51	76	34
		SB Thru	>500	10	31	0	0	28	0	0	17	27	17
		SB Thru	>500	0	0	0	0	0	0	0	0	0	0
		SB Thru-Right	>500	7	0	30	0	29	10	16	0	34	10
4	Blackstone Avenue / Weldon Avenue	EB Left	105	74	126	102	150	109	150	64	155	101	158
		EB Right	>300	55	104	90	87	59	122	54	192	103	139
		NB Left	395	157	92	254	133	306	177	128	88	250	199
		NB Thru	>500	99	155	128	287	117	190	154	217	197	228
		NB Thru	>500	111	161	135	266	140	213	197	248	239	263
		NB Thru	>500	129	198	158	235	156	239	231	260	239	261
		SB U-turn	*	*	*	140	66	131	68	25	37	112	151
		SB Thru	>300	212	219	255	239	258	228	215	232	267	273
		SB Thru	>300	163	195	235	167	225	215	175	206	223	255
		SB Thru	>300	145	115	163	128	223	157	140	149	214	199
		SB Right	100	99	67	144	94	202	108	90	60	172	104

Note: * = Does not exist or is not projected to exist

Table XI: Queuing Analysis (cont.)

ID	Intersection	Existing Queue Storage Length (ft.)		Existing		Existing plus Project		Near Term plus Project		Cumulative Year 2035 No Project		Cumulative Year 2035 plus Project	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
5	Blackstone Avenue / University Avenue	EB Left-Thru-Right	>300	62	69	*	*	*	*	*	*	*	*
		EB Right	>300	*	*	49	31	45	79	68	72	62	67
		WB Left-Thru-Right	>500	54	64	*	*	*	*	*	*	*	*
		WB Right	>300	*	*	76	69	54	61	66	90	55	68
		NB Left	85	82	55	84	55	96	69	98	58	99	68
		NB Thru	>500	0	0	0	0	54	29	10	0	10	17
		NB Thru	>500	0	0	0	0	0	0	0	0	0	10
		NB Thru-Right	>500	0	0	9	0	0	0	17	16	17	0
		SB Left	75	37	52	34	30	45	57	24	58	43	59
		SB Thru	>500	30	0	18	0	0	0	0	9	38	39
		SB Thru	>500	25	0	0	0	0	0	0	10	25	9
		SB Thru-Right	>500	17	10	0	0	7	10	0	32	44	19
6	Blackstone Avenue / McKinley Avenue	EB Left	245	184	215	259	180	345	357	253	245	380	409
		EB Thru	>500	133	90	152	65	245	405	145	173	930	607
		EB Thru	>500	129	79	127	52	203	292	165	139	874	499
		EB Right	150	28	17	43	20	34	23	49	129	62	97
		WB Left	255	113	114	120	72	139	128	141	150	115	160
		WB Thru	>500	178	169	153	137	188	178	190	174	186	169
		WB Thru	>500	150	132	147	87	199	169	169	156	192	163
		WB Right	100	98	105	130	65	159	131	102	98	171	123
		NB Left	185	107	139	158	81	169	165	250	256	251	261
		NB Thru	>500	165	188	251	209	315	234	336	365	611	513
		NB Thru	>500	150	190	158	237	237	218	269	294	517	454
		NB Thru	>500	105	148	109	164	158	202	199	218	383	247
		NB Right	160	41	45	48	27	38	55	93	73	149	111
		SB Left	205	189	266	269	191	256	310	275	250	307	328
		SB Thru	>500	127	120	186	133	213	261	236	225	276	571
		SB Thru	>500	151	148	141	135	163	182	216	225	246	316
		SB Thru	>500	139	153	135	107	141	168	193	189	264	218
		SB Right	105	102	92	105	85	116	130	103	121	215	192

Note: * = Does not exist or is not projected to exist

Project's Pro-Rata Fair Share of Future Transportation Improvements

The Project's fair share percentage impacts to study intersections projected to fall below their LOS threshold and which are not covered by an existing impact fee program is provided in Table XII. The Project's fair share percentage impacts were calculated pursuant to the Caltrans Guide for the Preparation of Traffic Impact Studies. The Project's pro-rata fair shares were calculated utilizing the Existing volumes, Project Only Trips, and Cumulative Year 2035 plus Project volumes. Figure 2 illustrates the Existing traffic volumes, Figure 6 illustrates the Net New Project Only Trips, and Figure 11 illustrates the Cumulative Year 2035 plus Project traffic volumes. Since the critical peak period for the study facilities was determined to be during the PM peak, the PM peak volumes are utilized to determine the Project's pro-rata fair share.

It is recommended that the Project contribute its equitable fair share as listed in Table XII for the future improvements necessary to maintain an acceptable LOS. However, fair share contributions should only be made for those facilities, or portion thereof, currently not funded by the responsible agencies roadway impact fee program(s) or grant funded projects, as appropriate. For those improvements not presently covered by local and regional roadway impact fee programs or grant funding, it is recommended that the Project contribute its equitable fair share. Payment of the Project's equitable fair share in addition to the local and regional impact fee programs would satisfy the Project's traffic mitigation measures.

This study does not provide construction costs for the recommended mitigation measures; therefore, if the recommended mitigation measures are implemented, it is recommended that the District work with the City of Fresno to develop the estimated construction cost.

Table XII: Project's Fair Share of Future Roadway Improvements

ID	*Intersection*	*Existing Traffic Volumes (PM Peak)*	*Cumulative Year 2035 plus Project Traffic Volumes (PM Peak)*	*Net New Project Only Trips (PM Peak)*	*Project's Fair Share (%)*
2	Glenn Avenue / Clinton Avenue	1,623	2,008	56	14.55
3	Blackstone Avenue / Cambridge Avenue	2,304	2,982	180	26.55
4	Blackstone Avenue / Weldon Avenue	2,533	3,318	434	55.29
5	Blackstone Avenue / University Avenue	2,304	2,880	297	51.56

Note: Project Fair Share = ((Net New Project Only Trips) / (Cumulative Year 2035 + Project Traffic Volumes - Existing Traffic Volumes)) x 100

Conclusions and Recommendations

Conclusions and recommendations regarding the proposed Project are presented below.

Existing Traffic Conditions

- At present, the intersection of Blackstone Avenue and University Avenue exceeds its LOS threshold during both peak periods. To improve the LOS at this intersection, it is recommended that the following improvements be implemented.
    - Blackstone Avenue / University Avenue
        - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

Existing plus Project Traffic Conditions

- At present, the Project is estimated to generate a maximum of 2,045 daily trips, 262 AM peak hour trips and 237 PM peak hour trips. However, the trip generation of the Project will differ as a result of the relocation, expansion and modification of the Project's land uses. At buildout, the proposed Future Project is estimated to generate a maximum of 2,230 daily trips, 287 AM peak hour trips and 268 PM peak hour trips. Compared to the Existing Project Trip Generation, the Future Project Trip Generation is estimated to be slightly higher by 185 daily trips, 25 AM peak hour trips, and 31 PM peak hour trips.
- It is recommended that the Project implement Class I Bike Routes along a) Glenn Avenue within the Project site, b) along the Project's frontage to Cambridge Avenue (between San Pablo Avenue and Blackstone Avenue) and c) Weldon Avenue within the Project site.
- It is recommended that the Project retain the existing walkways that are in a good state and ADA compliant along its frontages to San Pablo Avenue, Blackstone Avenue, Cambridge Avenue, and Weldon Avenue. The Project shall reconstruct walkways where needed to conform to current ADA guidelines.
- Where possible, consideration should be given to the planting of trees to provide shade and help reduce heat during the summer months. Additionally, it is recommended that the District work with FAX to improve headways of the existing transit routes serving the FCC campus.
- As the Project will be used to serve an existing student and employee population, it is likely that the Project would not add VMT per capita. Additionally, the Project site is located near transit services and pedestrian and bicycle networks.

- The portion of the Project that is the parking structure is anticipated to add a total of 1,000 parking spaces, while replacing 189 parking stalls. Therefore, the net change is 811 parking stalls (1,000 new parking stalls - 189 existing parking stalls = 811 net new parking stalls). Given that the current number of general public and metered on-site parking stalls is 2,388 and the Project will add 811 general public parking stalls, the new total of general public and metered on-site parking stalls will be 3,199 parking stalls. Since the parking supply is projected to be up to 3,199 general public and metered on-site parking stalls, it is anticipated that the FCC campus will have sufficient parking supply to accommodate the projected parking demand in the year 2028.
- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
    - Blackstone Avenue / Cambridge Avenue
        - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.
        - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.
    - Blackstone Avenue / University Avenue
        - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.
  - Blackstone Avenue / Weldon Avenue
    - Add a southbound U-turn-turn lane;
    - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
    - Modify the traffic signal to accommodate the added lane.

Existing plus Project Traffic Conditions - No Access to Cambridge Avenue

- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
  - Blackstone Avenue / Cambridge Avenue
    - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.
    - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.
  - Blackstone Avenue / University Avenue
    - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.
    - Blackstone Avenue / Weldon Avenue
        - Add a southbound U-turn-turn lane;
        - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
        - Modify the traffic signal to accommodate the added lane.
- When compared to the Existing plus Project Traffic Condition scenario, the prevention of the Parking Structure's access to Cambridge Avenue will encourage most southbound traffic on Blackstone Avenue and all northbound traffic on Blackstone Avenue to enter the site via Weldon Avenue, thus reducing traffic on Cambridge Avenue between Glenn Avenue and Blackstone Avenue. As can be seen from Tables V and VI, the prevention of the Parking Structure's access to Cambridge Avenue is projected to slightly improve the LOS at the intersection of Blackstone Avenue and Cambridge Avenue while the LOS at the intersection of Blackstone Avenue and Weldon Avenue is projected to slightly worsen.

Near Term plus Project Traffic Conditions

- The total trip generation for the Near Term Project is 2,132 daily trips, 171 AM peak hour trips and 150 PM peak hour trips.
- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
    - Blackstone Avenue / Cambridge Avenue
        - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.
        - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.

- Blackstone Avenue / University Avenue
  - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Peralta Way, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.
  - Blackstone Avenue / Weldon Avenue
    - Add a southbound U-turn-turn lane;
    - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
    - Modify the traffic signal to accommodate the added lane.

Cumulative Year 2035 No Project Traffic Conditions

- Under this scenario, the intersections of Blackstone Avenue and Cambridge Avenue and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
  - Blackstone Avenue / Cambridge Avenue
    - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.
    - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.

- Blackstone Avenue / University Avenue
  - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and McKinley Avenue, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.

- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.
  - Blackstone Avenue / Weldon Avenue
    - Add a southbound U-turn-turn lane;
    - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
    - Modify the traffic signal to accommodate the added lane.

Cumulative Year 2035 plus Project Traffic Conditions

- Under this scenario, the intersections of Glenn Avenue and Clinton Avenue, Blackstone Avenue and Cambridge Avenue, and Blackstone Avenue and University Avenue are projected to exceed their LOS threshold during one or both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
  - Glenn Avenue / Clinton Avenue
    - Modify the northbound left-right lane to a left-turn lane;
    - Add a northbound right-turn lane; and
    - Eliminate curbside parking along Glenn Avenue within the limits of the proposed right-turn lane and transitions thereof. The Queuing Analysis presents the storage capacity recommendation for this movement.
  - Blackstone Avenue / Cambridge Avenue
    - Modify Cambridge Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue northbound on Blackstone Avenue toward Cambridge Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Yale Avenue, and continue southbound on Blackstone Avenue toward Cambridge Avenue.

    - Furthermore, it is recommended that Yale Avenue access at Blackstone Avenue also be limited to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. The implementation of the raise median island at the intersection of Blackstone Avenue and Yale Avenue will prevent FCC traffic destined to the north on Blackstone Avenue from using Yale Avenue.
  - Blackstone Avenue / University Avenue
    - Modify University Avenue access at Blackstone Avenue to right-in, right-out and left-in access only. To accomplish this, it is recommended that a raised median island be implemented. With the introduction of the raised median island, eastbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto southbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and McKinley Avenue, and continue northbound on Blackstone Avenue toward University Avenue. Furthermore, with the introduction of the raised median island, westbound left-turns and through movements will need to be redirected. These movements will need to make a right-turn onto northbound Blackstone Avenue, proceed to make a U-turn at Blackstone Avenue and Weldon Avenue, and continue southbound on Blackstone Avenue toward University Avenue.
- While the intersection of Blackstone Avenue and Weldon Avenue is projected to operate at an acceptable LOS during both peak periods, it is recommended that this intersection be improved to allow for northbound and southbound U-turns. To achieve this, it is recommended that the following improvements be implemented.
  - Blackstone Avenue / Weldon Avenue
    - Add a southbound U-turn-turn lane;
    - Remove the R3-4 (U-turn prohibition) sign that serves the northbound left-turn pocket; and
    - Modify the traffic signal to accommodate the added lane.

Queuing Analysis

- It is recommended that the City consider left-turn and right-turn lane storage lengths as indicated in the Queuing Analysis.

Project's Equitable Fair Share

- It is recommended that the Project contribute its equitable fair share as listed in Table XII for the existing funding shortfall, if any, to future improvements necessary to maintain an acceptable LOS.

Study Participants

JLB Traffic Engineering, Inc. Personnel:

Jose Luis Benavides, PE, TE	Project Manager
Susana Maciel, EIT	Engineer I/II
Matthew Arndt, EIT	Engineer I/II
Javier Rios	Engineer I/II
Jove Alcazar	Engineer I/II
Dennis Wynn	Sr. Engineering Technician
Adrian Benavides	Engineering Aide
Justin Barnett	Engineering Aide
Jesus Garcia	Engineering Aide

Persons Consulted:

Scott Odell	Odell Planning and Research, Inc.
Jill Gormley, PE	City of Fresno
Harmanjit Dhaliwal, PE	City of Fresno
Brian Spaunhurst	County of Fresno
David Padilla	Caltrans
Kai Han, TE	Fresno COG
Lang Yu	Fresno COG

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1. City of Fresno, *2035 General Plan*.
2. County of Fresno, *2000 General Plan*.
3. *Guide for the Preparation of Traffic Impact Studies*, Caltrans, dated December 2002.
4. *Trip Generation,* 10th Edition, Washington D.C., Institute of Transportation Engineers, 2017.
5. *2014 California Manual on Uniform Traffic Control Devices*, Caltrans, November 7, 2014.
6. City of Fresno, *Active Transportation Plan*, December 2016, adopted March 2, 2017.
7. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. Governor's Office of Planning and Research, 2017, *Technical Advisory on Evaluating Transportation Impacts in CEQA*.

Appendix A: Scope of Work

April 23, 2019

Mrs. Jill Gormley, P.E.
Traffic Engineer
City of Fresno
2600 Fresno Street
Fresno, CA 93721-3616

Via Email Only: Jill.Gormley@fresno.gov

Subject: ***Proposed Scope of Work for the Preparation of a Traffic Impact Analysis for the Fresno City College Parking and Facilities Expansion Project in the City of Fresno (JLB Project 004-085)***

Dear Mrs. Gormley,

JLB Traffic Engineering, Inc. (JLB) hereby submits this Draft Scope of Work for the preparation of a Traffic Impact Analysis (TIA) for the State Center Community College District (SCCCD) Environmental Impact Report (EIR) for the proposed Parking and Facilities Expansion Project at the Fresno City College (FCC) campus. The Project is located on and adjacent to the northeast portion of the existing FCC campus in the City of Fresno. The Project consists of the following facilities:

a) Construction of a parking structure on the south side of Cambridge Avenue west of Blackstone Avenue located north of the existing district office building. The proposed parking structure would have a capacity for up to 1,000 parking spaces, include up to five levels of parking, and include ingress/egress points at Weldon Avenue and potentially Cambridge Avenue.
b) Construction of a three-story Science Building approximately 95,000 square-foot located near the southwest corner of Blackstone Avenue and Weldon Avenue. The new Science Building is proposed to include six (6) biology labs, three (3) anatomy and physiology labs, five (5) chemistry labs, two (2) physics labs, two (2) engineering labs, a computer lab, three (3) general educational classrooms, four (4) Design Science (Middle College) classrooms, a welcome center, tutorial space, and 34 faculty offices. Surface parking would also be added adjacent to the building. Existing Maintenance and Operations facilities located in this area would be removed and relocated to a different area of the campus (see section d below).
c) Replacement of the existing one-story, 5,255 square-foot Child Development Center with a new one-story, 16,480 square-foot Child Development Center at its current location.
d) Construction of a one-story, 10,000 square-foot Maintenance and Operations building plus a parking and storage area on the west side of San Pablo Avenue northwest of the existing Health Sciences Building.
e) Repurposing of the existing District administration building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department.

Development of the Project facilities would occur over the next five (5) years. Per information provided to JLB, the Project is consistent with the City of Fresno 2035 General Plan. An aerial of the Project vicinity and the Project Site Plan are shown in Exhibits A and B, respectively.

The purpose of the TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process. In order to evaluate on-site and off-site traffic impacts of the proposed Project, JLB proposes the following Scope of Work.

Scope of Work

- Request a Fresno Council of Governments (Fresno COG) traffic forecast model run for the Project (Select Zone Analysis) which will include the Project and the streets to be analyzed. The Fresno COG traffic forecasting model will be used to forecast traffic volumes for the Base Year 2019 and Cumulative Year 2035 scenarios.
- As necessary obtain recent (less than 12 months) or schedule and conduct new traffic counts at the study facility(ies). These counts will include pedestrians and vehicles. These counts will be conducted on typical school schedule and non-inclement weather days as soon as possible. These counts will not take place during weeks with holidays, non-school days, roadway construction, etc.
- Perform a site visit to observe existing traffic conditions, especially during the AM and PM peak hours. Existing roadway conditions including geometrics and traffic controls will be verified.
- Evaluate onsite circulation and provide recommendations as necessary to improve circulation to and within the Project site.
- JLB will prepare California Manual on Uniform Traffic Control Devices (CA MUTCD) peak hour signal warrants for unsignalized study intersections under all study scenarios.
- JLB will qualitatively analyze parking demand in the proximity of the proposed new buildings.
- JLB will qualitatively analyze existing and planned transit routes in the Project's vicinity.
- JLB will qualitatively analyze existing and planned bikeways in the Project's vicinity.
- Forecast trip distribution will be made on the basis of turn count information and knowledge of the existing and planned circulation network in the vicinity of the Project.
- JLB will evaluate existing and forecast future levels of service (LOS) at the study intersection(s) and/or segment(s). JLB will use HCM 6th Edition or HCM 2000 methodologies as appropriate within Synchro software to perform this analysis for the AM and PM peak hours. JLB will identify the cause(s) of poor level of service and proposed improvement measures (if any).
- JLB will prepare a table with the Project's pro-rata fair share allocation to improvement measures identified (if any) that are not currently funded by an existing funding source.

Study Scenarios:

1. Existing Traffic Conditions with needed improvements (if any);
2. Existing plus Project Traffic Conditions with proposed mitigation measures (if any);
3. Near Term plus Project Traffic Conditions with proposed mitigation measures (if any);
4. Cumulative Year 2035 No Project Traffic Conditions with proposed improvement measures (if any); and
5. Cumulative Year 2035 plus Project Traffic Conditions with proposed mitigation measures (if any).

Weekday peak hours to be analyzed (Tuesday through Thursday only):

1. 7-9 AM peak hour
2. 4-6 PM peak hour

Study Intersections:

1. San Pablo Avenue / Clinton Avenue
2. Blackstone Avenue / Cambridge Avenue
3. Blackstone Avenue / Weldon Avenue
4. Blackstone Avenue / University Avenue

Queuing analysis is included in the proposed Scope of Work for the study intersection(s) listed above under all study scenarios. This analysis will be utilized to recommend minimum storage lengths for left-turn and right-turn lanes at all study intersections.

Study Segments:

1. None

Project Only Trip Assignment to State Facilities:

1. State Route 41 at McKinley Avenue Interchange
2. State Route 180 at Blackstone Avenue & Abby Street Interchange

Project Trip Generation

Trip generation rates for the proposed Project will be obtained from the 10th Edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE).

Near Term Projects to be Included

JLB will be consulting with City of Fresno Planning & Development and Traffic Engineering staff to determine which Projects should be included in the Near Term plus Project analysis. JLB will include Near Term Projects in the vicinity of the proposed Project under the Near Term plus Project analysis for which the City, County or Caltrans has knowledge of and for which it is anticipated that said project(s) is/are projected to be whole or partially built by the Near Term Project year 2025. City, County of Fresno and Caltrans, as appropriate, would provide JLB with Near Term Project details such as a project description, location, proposed land uses with breakdowns and type of residential units and amount of square footages for non-residential uses.

The Scope of Work is based on our understanding of this Project and our experience with similar TIAs. In the absence of comments by May 14, 2019, it will be assumed that the above Scope of Work is acceptable to the agency(ies) that have not submitted any comments. If you have any questions or require additional information, please contact me by phone at (559) 317-6273 or by email at smaciel@JLBtraffic.com.

Sincerely,

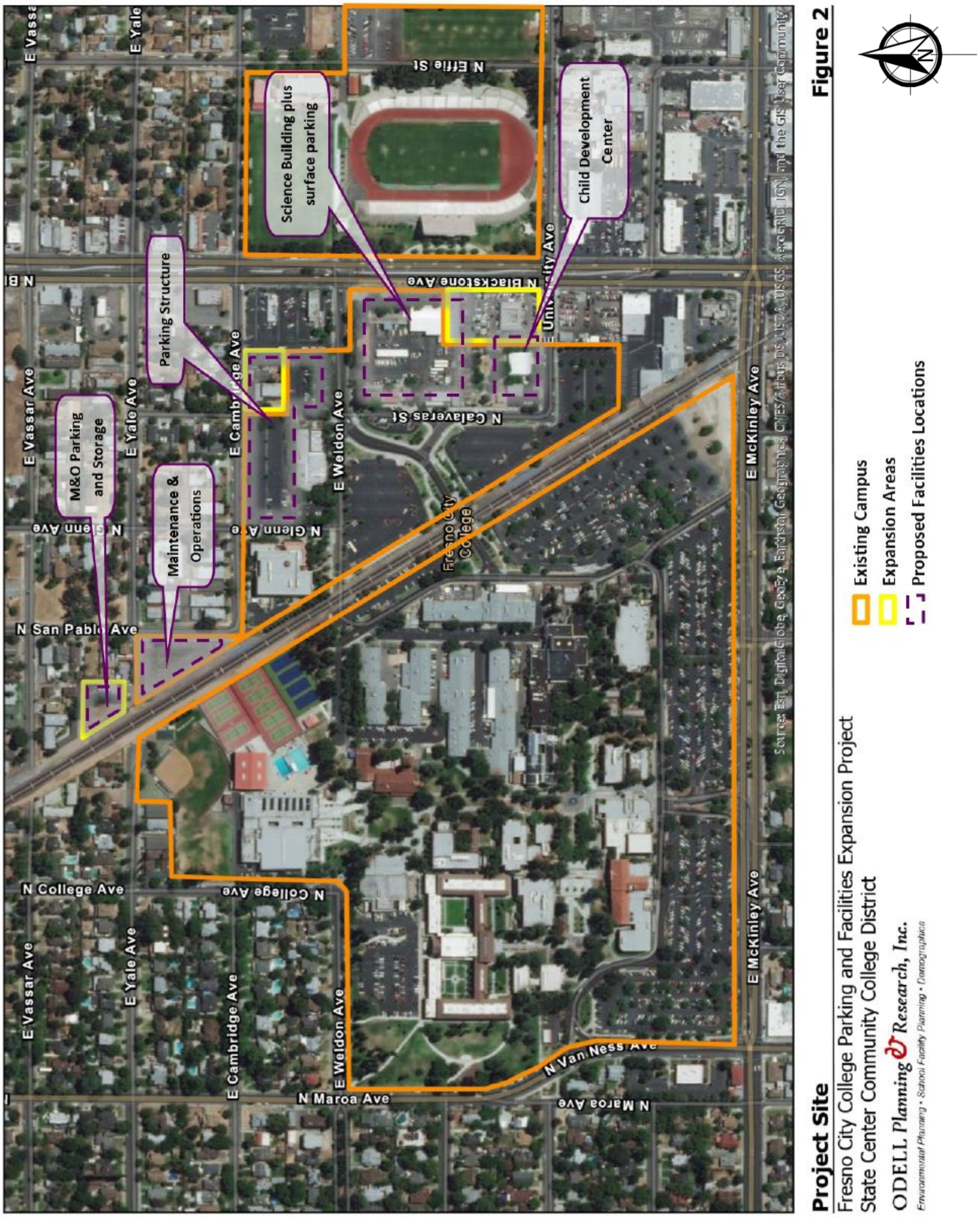
Susana Maciel

Susana Maciel, EIT
Engineer I/II

cc: Harmanjit Dhaliwal, City of Fresno
Brian Spaunhurst, County of Fresno
David Padilla, Caltrans

Exhibit A - Aerial

Exhibit B - Project Site Plan



Jose Benavides

From: Spaunhurst, Brian <bspaunhurst@fresnocountyca.gov>
Sent: Monday, April 29, 2019 11:27 AM
To: Susana Maciel; Jill Gormley
Cc: Harmanjit Dhaliwal; David Padilla (dave_padilla@dot.ca.gov); Jose Benavides
Subject: RE: FCC Parking & Facilities Expansion TIA: Draft Scope of Work

Good Morning Susana,

The proposed scope is acceptable to the County.

Respectfully,

Brian Spaunhurst| **Planner II**
Department of Public Works and Planning | Design Division
2220 Tulare St. 6th Floor Fresno, CA 93721
Main Office: (559) 600-4532 | Direct: (559) 600-4532
Email: bspaunhurst@FresnoCountyCa.gov
Your input matters! Customer Service Survey

From: Susana Maciel <smaciel@jlbtraffic.com>
Sent: Tuesday, April 23, 2019 8:34 AM
To: Jill Gormley <Jill.Gormley@fresno.gov>
Cc: Harmanjit Dhaliwal <Harmanjit.Dhaliwal@fresno.gov>; Spaunhurst, Brian <bspaunhurst@fresnocountyca.gov>; David Padilla (dave_padilla@dot.ca.gov) <dave_padilla@dot.ca.gov>; Jose Benavides <jbenavides@jlbtraffic.com>
Subject: FCC Parking & Facilities Expansion TIA: Draft Scope of Work

Good morning, Mrs. Gormley,

Attached you will find a Draft Scope of Work Letter for the preparation of a TIA for the SCCCD EIR for the proposed Parking and Facilities Expansion Project at the Fresno City College campus. I kindly ask that you take some time to review and comment on the proposed Scope of Work.

In the absence of comments by May 14th, it will be assumed that the proposed Scope of Work is acceptable to the agency(ies) that have not submitted any comments. Please feel welcome to contact me if you have any questions or require any additional information.

I sincerely appreciate your time and attention to this matter and look forward to hearing from you soon. Have a great day!

Best,

Susana Maciel, EIT
Engineer I/II

JLB TRAFFIC ENGINEERING, INC.

Traffic Engineering, Transportation Planning and Parking Solutions
Certified Disadvantaged Business Enterprise (DBE) and Small Business Enterprise (SBE)

1300 E. Shaw Ave., Ste. 103
Fresno, CA 93710
Direct: (559) 317-6273
Office: (559) 570-8991
Cell: (559) 232-9474
www.JLBtraffic.com

Attached you will find a Draft Scope of Work for the preparation of a Traffic Impact Analysis for a Project adjacent to the City of Fresno in Fresno County. I kindly ask that you take a moment to review and comment on the proposed Scope of Work.

In the absence of comments by April 3, 2018, it will be assumed that the proposed Scope of Work is acceptable to the agency(ies) that have not submitted any comments. Please do not hesitate to contact me if you have any questions or require any additional information. I can be reached by phone at 559.570.8991 or by email at smaciel@jlbtraffic.com.

I sincerely appreciate your time and attention to this matter and look forward to hearing from you soon.

From:	Padilla, Dave@DOT
To:	Susana Maciel; Jill Gormley; Harmanjit Dhaliwal
Cc:	Jose Benavides
Subject:	RE: FCC Parking & Facilities Expansion TIA: Draft Scope of Work
Date:	Friday, May 24, 2019 11:35:09 AM
Attachments:	image001.jpg

Hello Susana,

We are satisfied with the SOW as proposed.

Thank you

DAVID PADILLA
Associate Transportation Planner
Caltrans
Office of Planning & Local Assistance
1352 W. Olive Avenue
Fresno, CA 93778-2616
Office: (559) 444-2493, Fax: (559) 445-5875

From: Susana Maciel <smaciel@jlbtraffic.com>
Sent: Friday, May 24, 2019 11:18 AM
To: Jill Gormley <Jill.Gormley@fresno.gov>; Harmanjit Dhaliwal <Harmanjit.Dhaliwal@fresno.gov>; Padilla, Dave@DOT <dave.padilla@dot.ca.gov>
Cc: Jose Benavides <jbenavides@jlbtraffic.com>
Subject: RE: FCC Parking & Facilities Expansion TIA: Draft Scope of Work

Good morning,

I want to verify that neither the City nor Caltrans has any comments of the proposed Scope of Work for this Project and thus approves the Scope of Work as presented. If for any reason this is not the case, I ask that you please respond with your comment(s) at your earliest convenience.

I appreciate your time and attention to this matter.

Best,

Susana Maciel, EIT
Engineer I/II

JLB Logo

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Cc: Harmanjit Dhaliwal <Harmanjit.Dhaliwal@fresno.gov>; Spaunhurst, Brian (bspaunhurst@fresnocountyca.gov) <bspaunhurst@fresnocountyca.gov>; David Padilla (dave_padilla@dot.ca.gov) <dave_padilla@dot.ca.gov>; Jose Benavides <jbenavides@jlbtraffic.com>
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I sincerely appreciate your time and attention to this matter and look forward to hearing from you soon.

Jose Benavides

From: Harmanjit Dhaliwal <Harmanjit.Dhaliwal@fresno.gov>
Sent: Tuesday, May 28, 2019 5:28 PM
To: Susana Maciel; Jill Gormley; David Padilla (dave_padilla@dot.ca.gov)
Cc: Jose Benavides
Subject: RE: FCC Parking & Facilities Expansion TIA: Draft Scope of Work

Good Evening Susana,

The City would like to add the intersection of McKinley and Blackstone to this Scope of Work.

Thanks,

Harmanjit Dhaliwal, PE

City of FRESNO
Public Works Department
Traffic Operations & Planning Division
2600 Fresno Street, Room 4064
Fresno, CA 93721
Ph: (559) 621-8694
Harmanjit.Dhaliwal@fresno.gov

From: Susana Maciel [mailto:smaciel@jlbtraffic.com]
Sent: Friday, May 24, 2019 11:18 AM
To: Jill Gormley; Harmanjit Dhaliwal; David Padilla (dave_padilla@dot.ca.gov)
Cc: Jose Benavides
Subject: RE: FCC Parking & Facilities Expansion TIA: Draft Scope of Work

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Susana Maciel, EIT
Engineer I/II

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Sent: Tuesday, April 23, 2019 8:34 AM
To: Jill Gormley <Jill.Gormley@fresno.gov>
Cc: Harmanjit Dhaliwal <Harmanjit.Dhaliwal@fresno.gov>; Spaunhurst, Brian (bspaunhurst@fresnocountyca.gov) <bspaunhurst@fresnocountyca.gov>; David Padilla (dave_padilla@dot.ca.gov) <dave_padilla@dot.ca.gov>; Jose Benavides <jbenavides@jlbtraffic.com>
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Susana Maciel, EIT
Engineer I/II

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I sincerely appreciate your time and attention to this matter and look forward to hearing from you soon.

Appendix B: Traffic Counts

JLB Traffic Engineering, Inc.

1300 E. Shaw Ave., Ste. 103
Fresno, CA 93710
(559) 570-8991
Traffic Engineering, Transportation Planning & Parking Solutions
www.JLBtraffic.com

File Name : San Pablo at Clinton
Site Code : 00000000
Start Date : 4/25/2019
Page No : 1

Groups Printed- Unshifted

	CLINTON Westbound			**SAN PABLO Northbound**			**CLINTON Eastbound**			
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Int. Total
07:00 AM	0	63	0	3	0	0	135	2	1	204
07:15 AM	1	97	0	2	0	0	178	6	1	285
07:30 AM	1	111	0	3	4	0	217	8	4	348
07:45 AM	3	179	0	4	4	0	245	7	0	442
Total	5	450	0	12	8	0	775	23	6	1279
08:00 AM	1	122	0	5	3	0	239	4	0	374
08:15 AM	0	79	0	3	1	0	170	6	2	261
08:30 AM	4	91	0	5	2	0	123	9	0	234
08:45 AM	1	88	0	3	3	0	119	6	1	221
Total	6	380	0	16	9	0	651	25	3	1090
******										
03:00 PM	1	132	0	4	1	0	181	4	1	324
03:15 PM	1	152	0	2	5	0	170	4	6	340
03:30 PM	3	144	0	5	4	0	174	7	3	340
03:45 PM	2	169	0	5	3	0	152	3	2	336
Total	7	597	0	16	13	0	677	18	12	1340
04:00 PM	2	184	0	6	3	0	153	0	1	349
04:15 PM	5	166	0	4	5	0	129	7	1	317
04:30 PM	4	223	0	7	0	0	166	3	1	404
04:45 PM	1	203	0	5	7	0	161	7	2	386
Total	12	776	0	22	15	0	609	17	5	1456
05:00 PM	2	228	0	5	3	0	162	4	2	406
05:15 PM	3	208	0	4	4	0	183	4	2	408
05:30 PM	3	185	0	2	1	0	148	4	1	344
05:45 PM	2	167	0	7	1	0	164	2	1	344
Total	10	788	0	18	9	0	657	14	6	1502
Grand Total	40	2991	0	84	54	0	3369	97	32	6667
Apprch %	1.3	98.7	0	60.9	39.1	0	96.3	2.8	0.9	
Total %	0.6	44.9	0	1.3	0.8	0	50.5	1.5	0.5	

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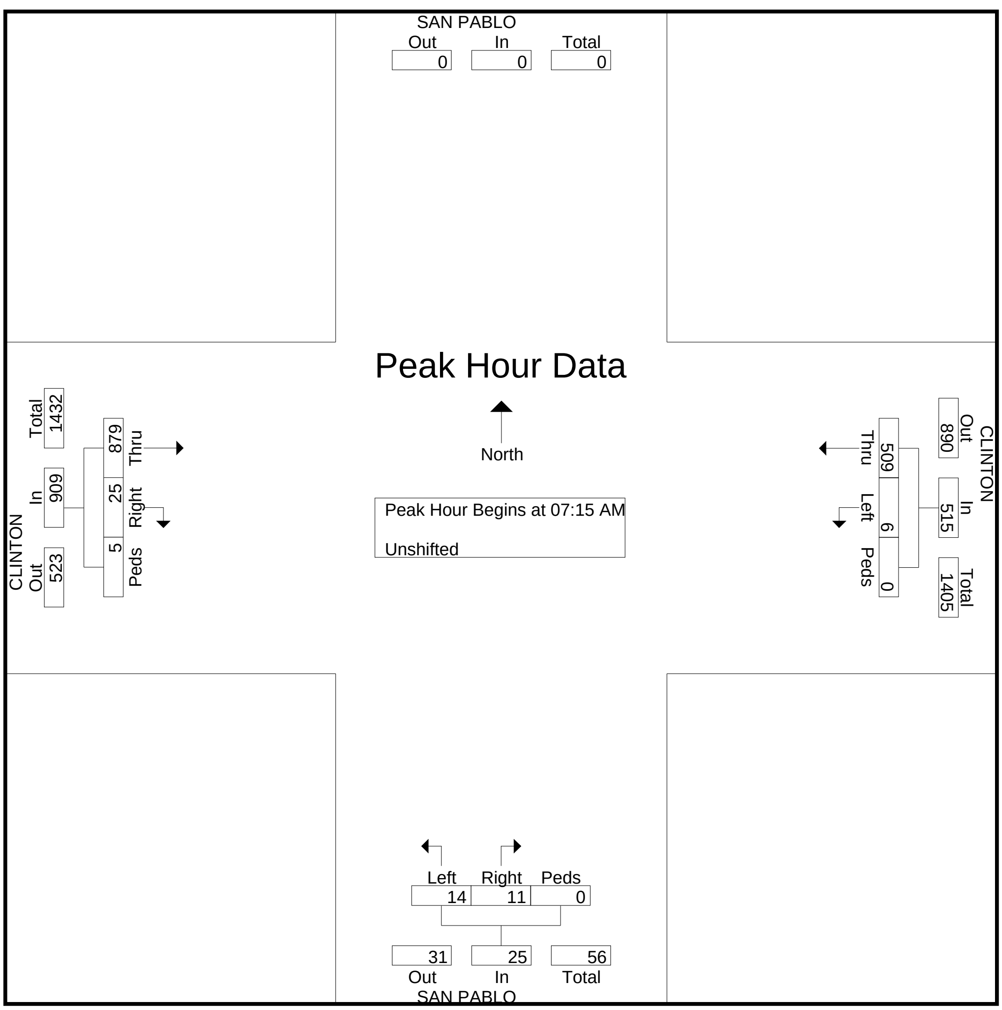
File Name : San Pablo at Clinton
Site Code : 00000000
Start Date : 4/25/2019
Page No : 2

	CLINTON Westbound				SAN PABLO Northbound				CLINTON Eastbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	1	97	0	98	2	0	0	2	178	6	1	185	285
07:30 AM	1	111	0	112	3	**4**	0	7	217	**8**	**4**	229	348
07:45 AM	**3**	**179**	0	**182**	4	4	0	**8**	**245**	7	0	**252**	**442**
08:00 AM	1	122	0	123	**5**	3	0	8	239	4	0	243	374
Total Volume	6	509	0	515	14	11	0	25	879	25	5	909	1449
% App. Total	1.2	98.8	0		56	44	0		96.7	2.8	0.6		
PHF	.500	.711	.000	.707	.700	.688	.000	.781	.897	.781	.313	.902	.820



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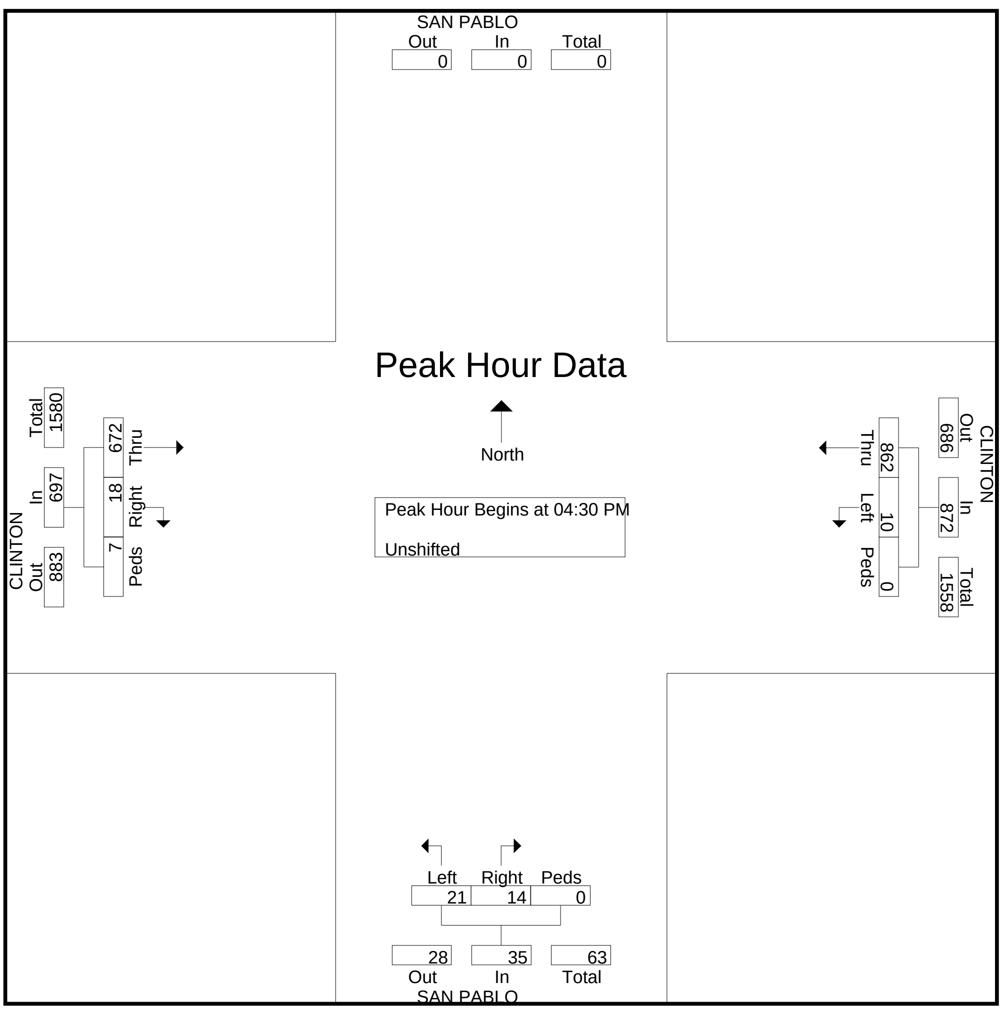
File Name : San Pablo at Clinton
Site Code : 00000000
Start Date : 4/25/2019

	CLINTON Westbound				SAN PABLO Northbound				CLINTON Eastbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	**4**	223	0	227	**7**	0	0	7	166	3	1	170	404
04:45 PM	1	203	0	204	5	**7**	0	**12**	161	**7**	**2**	170	386
05:00 PM	2	**228**	0	**230**	5	3	0	8	162	4	2	168	406
05:15 PM	3	208	0	211	4	4	0	8	**183**	4	2	**189**	**408**
Total Volume	10	862	0	872	21	14	0	35	672	18	7	697	1604
% App. Total	1.1	98.9	0		60	40	0		96.4	2.6	1		
PHF	.625	.945	.000	.948	.750	.500	.000	.729	.918	.643	.875	.922	.983



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:
JLB Traffic Engineering, Inc.
1300 E. Shaw Ave, Suite 103
Fresno, CA

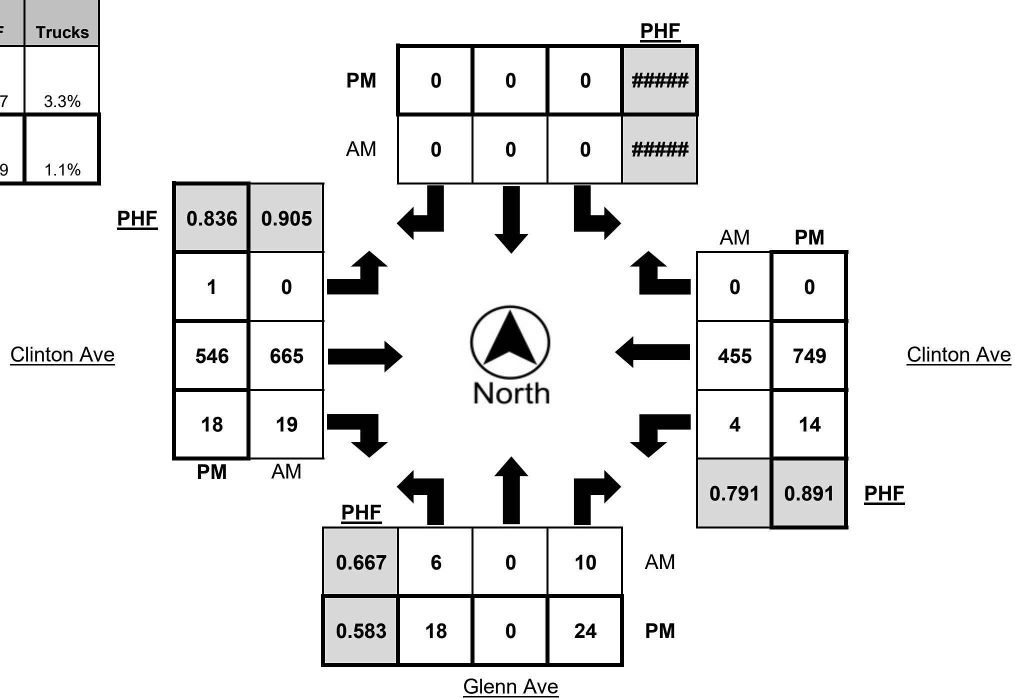
LOCATION Clinton Ave @ Glenn Ave
LATITUDE 36.7723
COUNTY Fresno
LONGITUDE -119.7934
COLLECTION DATE Wednesday, June 5, 2019
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:00 AM - 7:15 AM	4	0	1	0	0	0	0	0	0	92	6	6	3	61	0	0
7:15 AM - 7:30 AM	1	0	3	0	0	0	0	0	0	141	0	11	0	88	0	0
7:30 AM - 7:45 AM	1	0	1	0	0	0	0	0	0	158	8	4	1	112	0	2
7:45 AM - 8:00 AM	2	0	2	0	0	0	0	0	0	184	5	8	1	144	0	4
8:00 AM - 8:15 AM	2	0	4	0	0	0	0	0	0	182	6	4	2	111	0	5
8:15 AM - 8:30 AM	1	0	2	0	0	0	0	0	0	118	2	6	0	105	0	4
8:30 AM - 8:45 AM	1	0	0	0	0	0	0	0	0	138	0	4	2	69	0	6
8:45 AM - 9:00 AM	1	0	2	0	0	0	0	0	0	108	0	6	3	85	0	4
TOTAL	**13**	**0**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**1121**	**27**	**49**	**12**	**775**	**0**	**25**

	Northbound				Southbound				Eastbound				Westbound			
Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
4:00 PM - 4:15 PM	4	0	6	0	0	0	0	0	0	127	1	0	5	185	0	3
4:15 PM - 4:30 PM	5	0	1	0	0	0	0	0	0	134	4	0	2	199	0	5
4:30 PM - 4:45 PM	6	0	2	0	0	0	0	0	0	119	5	0	2	175	0	7
4:45 PM - 5:00 PM	2	0	6	0	0	0	0	0	0	145	7	0	5	163	0	2
5:00 PM - 5:15 PM	3	0	5	0	0	0	0	0	1	163	5	0	1	203	0	5
5:15 PM - 5:30 PM	7	0	11	0	0	0	0	0	0	119	1	0	6	208	0	1
5:30 PM - 5:45 PM	4	0	5	0	0	0	0	0	0	150	4	0	7	122	0	1
5:45 PM - 6:00 PM	1	0	7	1	0	0	0	0	0	125	4	0	4	139	0	2
TOTAL	**32**	**0**	**43**	**1**	**0**	**0**	**0**	**0**	**1**	**1082**	**31**	**0**	**32**	**1394**	**0**	**26**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:15 AM - 8:15 AM	6	0	10	0	0	0	0	0	0	665	19	27	4	455	0	11
4:30 PM - 5:30 PM	18	0	24	0	0	0	0	0	1	546	18	0	14	749	0	15

	PHF	Trucks
AM	0.857	3.3%
PM	0.899	1.1%



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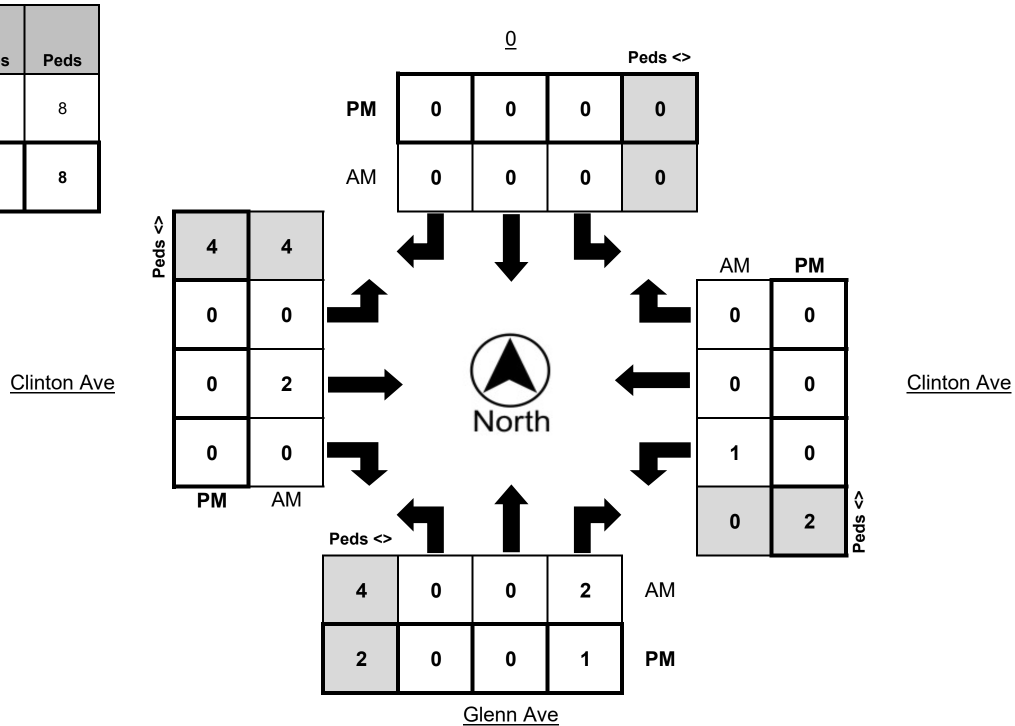
LOCATION Clinton Ave @ Glenn Ave
LATITUDE 36.7723
COUNTY Fresno
LONGITUDE -119.7934
COLLECTION DATE Wednesday, June 5, 2019
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
7:30 AM - 7:45 AM	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**5**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**6**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5:30 PM - 5:45 PM	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
TOTAL	**1**	**0**	**3**	**0**	**0**	**0**	**0**	**11**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**4**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:15 AM - 8:15 AM	0	0	2	0	0	0	0	4	0	2	0	0	1	0	0	4
4:30 PM - 5:30 PM	0	0	1	0	0	0	0	2	0	0	0	2	0	0	0	4

	Bikes	Peds
AM Peak Total	5	8
PM Peak Total	1	8



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File Name : Blackstone at Cambridge
Site Code : 00000000
Start Date : 4/30/2019
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Groups Printed- Unshifted - Bank 2 (Uturns)

	BLACKSTONE Southbound				**CAMBRIDGE Westbound**				**BLACKSTONE Northbound**				**CAMBRIDGE Eastbound**				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00 AM	10	130	6	1	2	0	5	0	8	51	9	1	0	1	1	0	225
07:15 AM	26	178	8	3	2	0	15	0	10	99	2	9	0	1	7	0	360
07:30 AM	23	234	6	3	5	1	16	0	19	153	13	2	0	0	4	0	479
07:45 AM	18	336	13	1	1	0	21	1	15	167	10	0	4	0	7	0	594
Total	77	878	33	8	10	1	57	1	52	470	34	12	4	2	19	0	1658
08:00 AM	14	275	13	3	1	0	12	0	17	206	5	1	1	0	5	0	553
08:15 AM	9	172	6	1	0	0	1	0	6	167	7	2	1	0	5	0	377
08:30 AM	13	160	11	0	2	0	6	0	9	126	8	2	1	1	2	2	343
08:45 AM	12	147	4	0	0	0	3	0	12	142	7	7	0	0	8	0	342
Total	48	754	34	4	3	0	22	0	44	641	27	12	3	1	20	2	1615
******																	
03:00 PM	9	194	2	1	1	0	0	0	12	239	5	6	2	0	2	0	473
03:15 PM	5	206	4	3	2	1	5	0	5	229	9	2	3	1	8	1	484
03:30 PM	8	182	1	2	2	0	10	0	10	243	5	2	2	1	4	1	473
03:45 PM	31	209	2	0	1	1	9	0	3	289	9	2	3	1	8	0	568
Total	53	791	9	6	6	2	24	0	30	1000	28	12	10	3	22	2	1998
04:00 PM	21	162	4	2	8	1	30	1	4	243	7	4	4	3	11	1	506
04:15 PM	11	167	3	6	3	1	9	0	7	264	4	5	4	0	12	0	496
04:30 PM	7	205	1	1	1	0	10	0	9	278	2	4	3	1	24	0	546
04:45 PM	7	226	1	4	3	0	8	0	4	281	4	4	3	1	11	1	558
Total	46	760	9	13	15	2	57	1	24	1066	17	17	14	5	58	2	2106
05:00 PM	6	236	1	3	2	0	7	0	4	343	5	4	5	1	7	0	624
05:15 PM	8	216	3	1	3	2	10	0	7	336	2	6	3	1	6	0	604
05:30 PM	5	245	2	0	0	0	6	0	7	246	0	4	0	0	2	0	517
05:45 PM	7	235	2	1	5	0	4	0	2	218	2	2	1	0	0	0	479
Total	26	932	8	5	10	2	27	0	20	1143	9	16	9	2	15	0	2224
Grand Total	250	4115	93	36	44	7	187	2	170	4320	115	69	40	13	134	6	9601
Apprch %	5.6	91.6	2.1	0.8	18.3	2.9	77.9	0.8	3.6	92.4	2.5	1.5	20.7	6.7	69.4	3.1	
Total %	2.6	42.9	1	0.4	0.5	0.1	1.9	0	1.8	45	1.2	0.7	0.4	0.1	1.4	0.1	
Unshifted	209	4111	93	36	44	6	187	2	125	4320	113	69	40	13	134	6	9508
% Unshifted	83.6	99.9	100	100	100	85.7	100	100	73.5	100	98.3	100	100	100	100	100	99
Bank 2 (Uturns)	41	4	0	0	0	1	0	0	45	0	2	0	0	0	0	0	93
% Bank 2 (Uturns)	16.4	0.1	0	0	0	14.3	0	0	26.5	0	1.7	0	0	0	0	0	1

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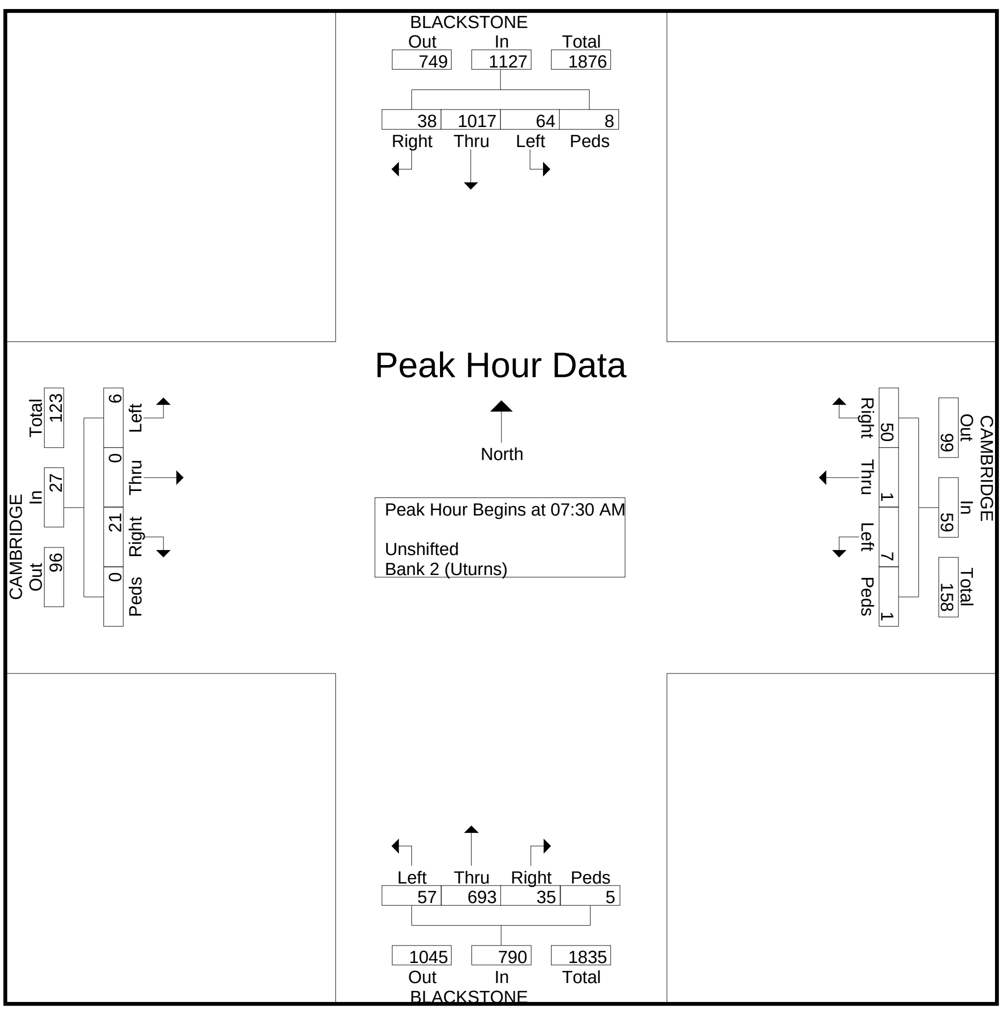
	BLACKSTONE Southbound					CAMBRIDGE Westbound					BLACKSTONE Northbound					CAMBRIDGE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	**23**	234	6	**3**	266	**5**	**1**	16	0	22	**19**	153	**13**	**2**	187	0	0	4	0	4	479
07:45 AM	18	**336**	**13**	1	**368**	1	0	**21**	**1**	**23**	15	167	10	0	192	**4**	0	**7**	0	**11**	**594**
08:00 AM	14	275	13	3	305	1	0	12	0	13	17	**206**	5	1	**229**	1	0	5	0	6	553
08:15 AM	9	172	6	1	188	0	0	1	0	1	6	167	7	2	182	1	0	5	0	6	377
Total Volume	64	1017	38	8	1127	7	1	50	1	59	57	693	35	5	790	6	0	21	0	27	2003
% App. Total	5.7	90.2	3.4	0.7		11.9	1.7	84.7	1.7		7.2	87.7	4.4	0.6		22.2	0	77.8	0		
PHF	.696	.757	.731	.667	.766	.350	.250	.595	.250	.641	.750	.841	.673	.625	.862	.375	.000	.750	.000	.614	.843



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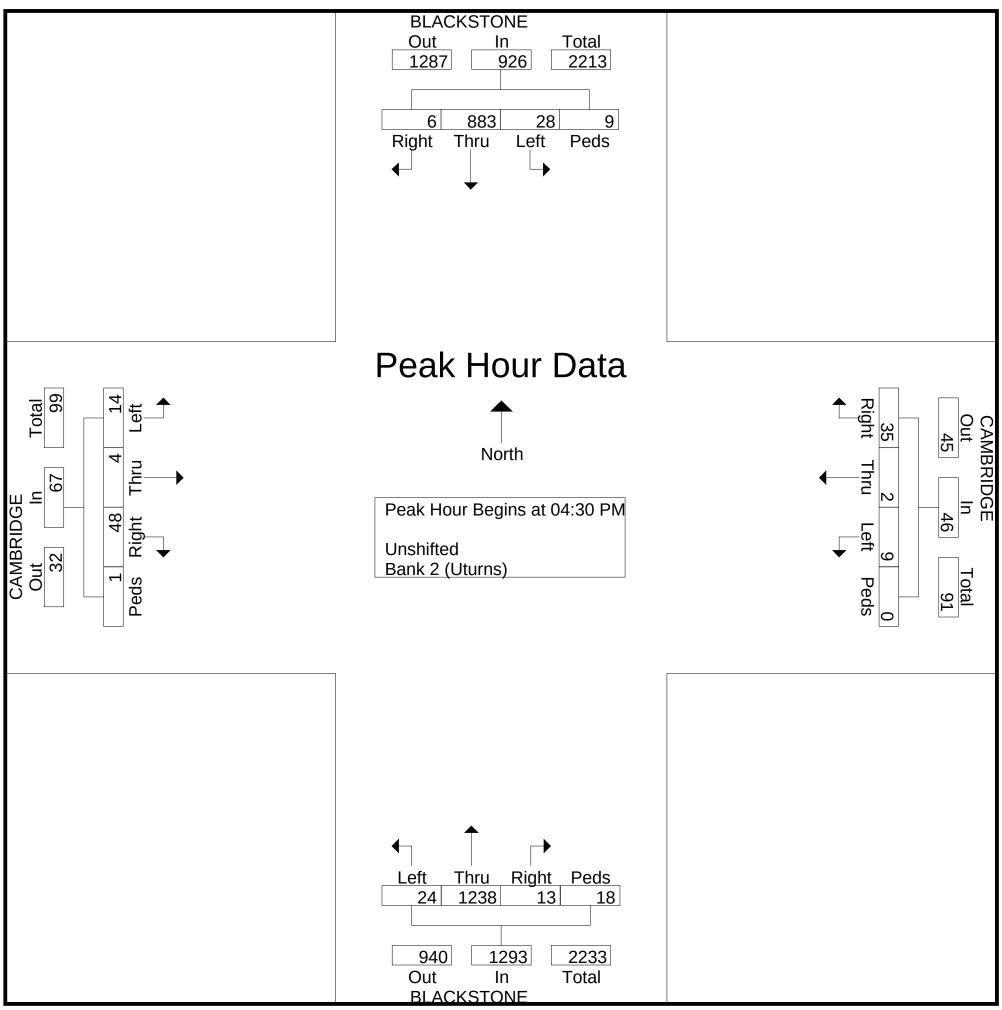
	BLACKSTONE Southbound					CAMBRIDGE Westbound					BLACKSTONE Northbound					CAMBRIDGE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	7	205	1	1	214	1	0	**10**	0	11	**9**	278	2	4	293	3	**1**	**24**	0	**28**	546
04:45 PM	7	226	1	**4**	238	**3**	0	8	0	11	4	281	4	4	293	3	1	11	**1**	16	558
05:00 PM	6	**236**	1	3	**246**	2	0	7	0	9	4	**343**	**5**	4	**356**	**5**	1	7	0	13	**624**
05:15 PM	**8**	216	**3**	1	228	3	**2**	10	0	**15**	7	336	2	**6**	351	3	1	6	0	10	604
Total Volume	28	883	6	9	926	9	2	35	0	46	24	1238	13	18	1293	14	4	48	1	67	2332
% App. Total	3	95.4	0.6	1		19.6	4.3	76.1	0		1.9	95.7	1	1.4		20.9	6	71.6	1.5		
PHF	.875	.935	.500	.563	.941	.750	.250	.875	.000	.767	.667	.902	.650	.750	.908	.700	1.00	.500	.250	.598	.934



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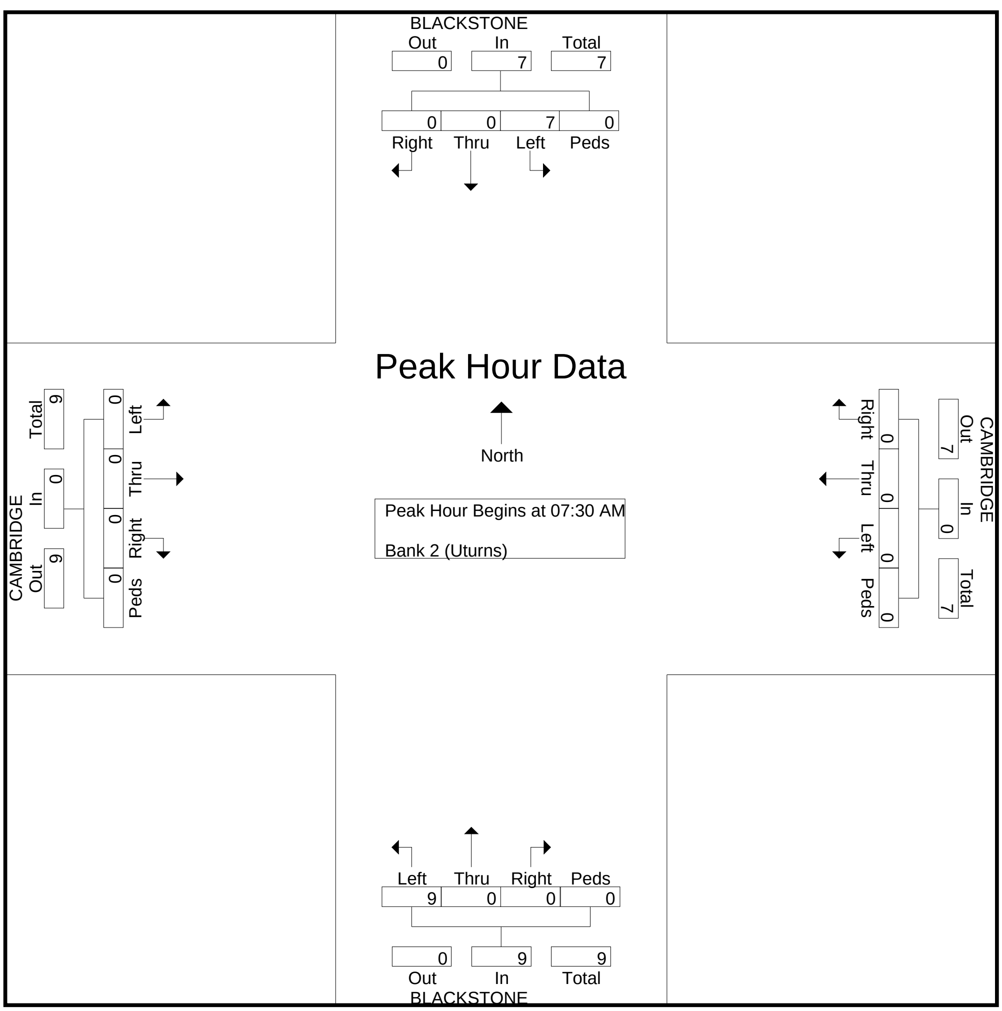
	BLACKSTONE Southbound					CAMBRIDGE Westbound					BLACKSTONE Northbound					CAMBRIDGE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	1	0	0	0	1	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	4
08:00 AM	2	0	0	0	2	0	0	0	0	0	**5**	0	0	0	**5**	0	0	0	0	0	**7**
08:15 AM	**4**	0	0	0	**4**	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	5
Total Volume	7	0	0	0	7	0	0	0	0	0	9	0	0	0	9	0	0	0	0	0	16
% App. Total	100	0	0	0		0	0	0	0		100	0	0	0		0	0	0	0		
PHF	.438	.000	.000	.000	.438	.000	.000	.000	.000	.000	.450	.000	.000	.000	.450	.000	.000	.000	.000	.000	.571



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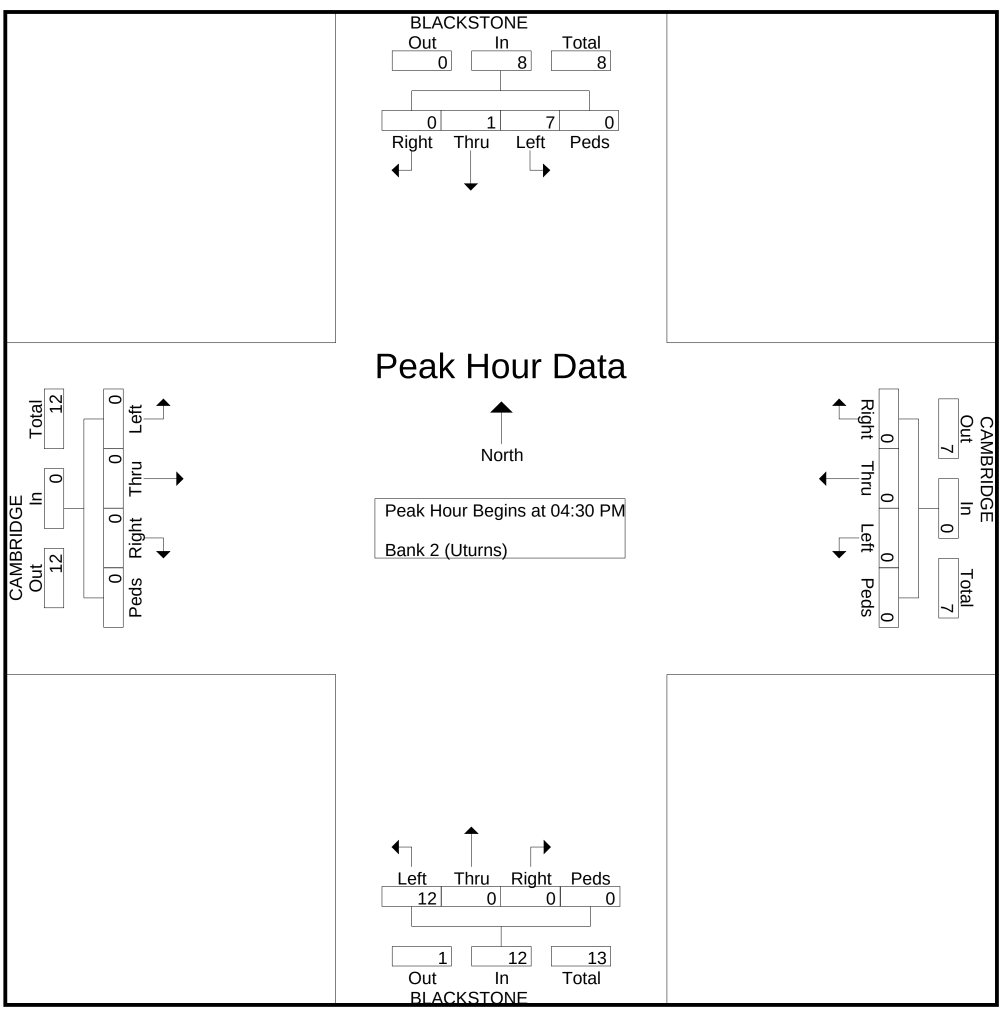
	BLACKSTONE Southbound					CAMBRIDGE Westbound					BLACKSTONE Northbound					CAMBRIDGE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**2**	0	0	0	**2**	0	0	0	0	0	**4**	0	0	0	**4**	0	0	0	0	0	**6**
04:45 PM	1	**1**	0	0	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3
05:00 PM	2	0	0	0	2	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	6
05:15 PM	2	0	0	0	2	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	5
Total Volume	7	1	0	0	8	0	0	0	0	0	12	0	0	0	12	0	0	0	0	0	20
% App. Total	87.5	12.5	0	0		0	0	0	0		100	0	0	0		0	0	0	0		
PHF	.875	.250	.000	.000	1.00	.000	.000	.000	.000	.000	.750	.000	.000	.000	.750	.000	.000	.000	.000	.000	.833



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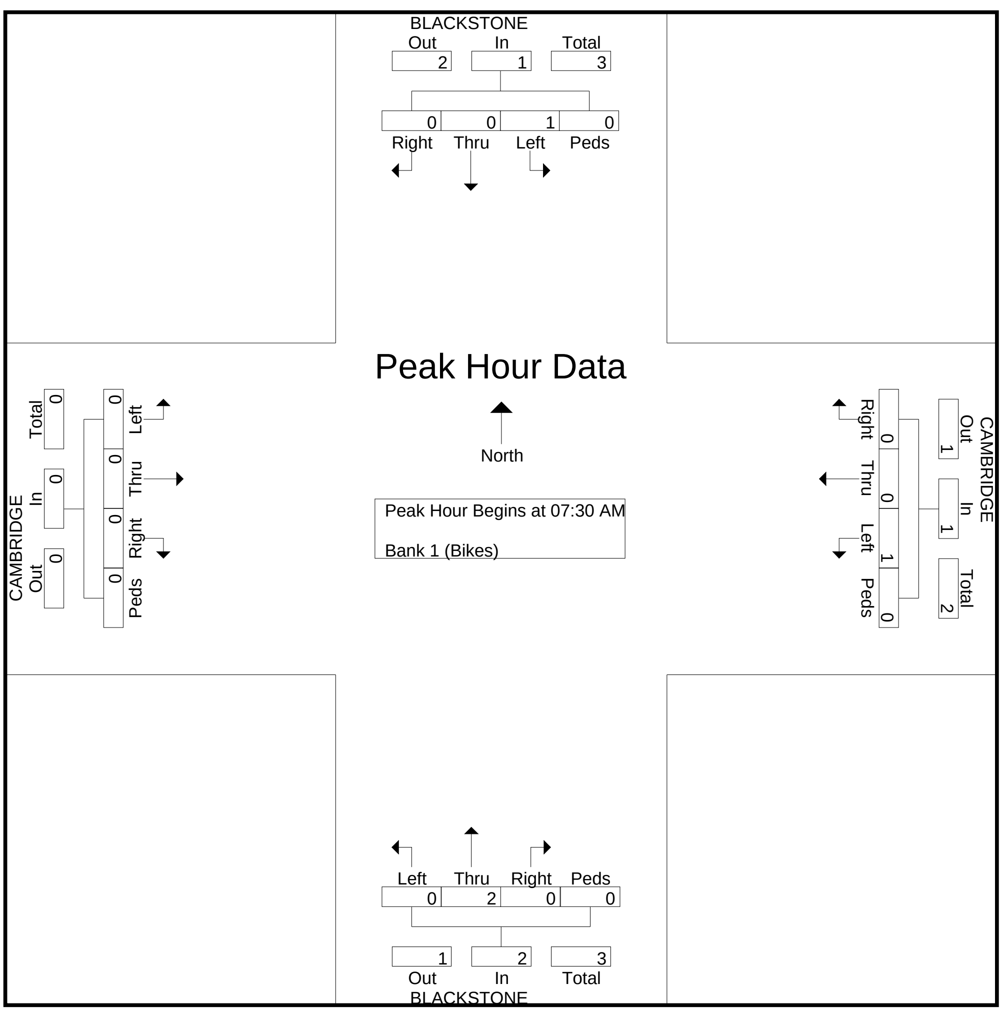
	BLACKSTONE Southbound					CAMBRIDGE Westbound					BLACKSTONE Northbound					CAMBRIDGE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	**1**	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	**1**	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	**2**	0	0	**2**	0	0	0	0	0	**2**
Total Volume	1	0	0	0	1	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	4
% App. Total	100	0	0	0		100	0	0	0		0	100	0	0		0	0	0	0		
PHF	.250	.000	.000	.000	.250	.250	.000	.000	.000	.250	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.500



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File Name : Blackstone at Cambridge
Site Code : 00000000
Start Date : 4/30/2019
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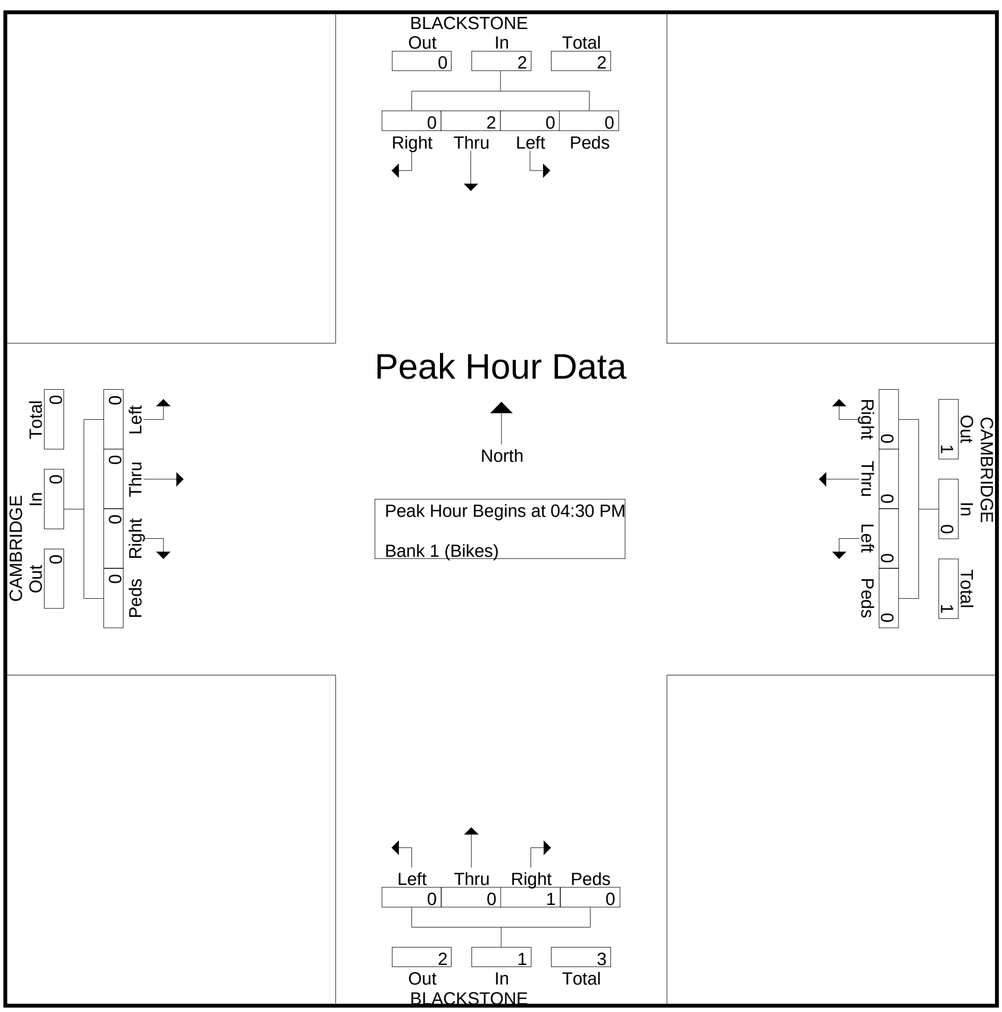
	BLACKSTONE Southbound					CAMBRIDGE Westbound					BLACKSTONE Northbound					CAMBRIDGE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	1
Total Volume	0	2	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3
% App. Total	0	100	0	0		0	0	0	0		0	0	100	0		0	0	0	0		
PHF	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.750



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File Name : Blackstone at Weldon
Site Code : 00000000
Start Date : 4/9/2019

Groups Printed- Unshifted - turns)

	BLACKSTONE Southbound			BLACKSTONE Northbound			WELDON Eastbound			
Start Time	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds	Int. Total
07:00 AM	68	35	0	9	46	0	10	5	3	176
07:15 AM	131	44	4	15	92	0	11	4	5	306
07:30 AM	146	79	2	26	122	0	9	4	27	415
07:45 AM	240	110	4	34	165	0	30	27	37	647
Total	585	268	10	84	425	0	60	40	72	1544
08:00 AM	230	66	1	26	170	0	20	25	5	543
08:15 AM	150	32	0	20	138	0	15	21	10	386
08:30 AM	139	22	2	21	155	0	22	18	6	385
08:45 AM	122	33	3	19	119	0	33	19	34	382
Total	641	153	6	86	582	0	90	83	55	1696
******										
04:00 PM	195	17	3	9	208	0	36	22	31	521
04:15 PM	169	24	9	18	225	0	45	42	21	553
04:30 PM	197	27	5	13	270	0	40	47	9	608
04:45 PM	205	27	8	14	239	0	39	42	8	582
Total	766	95	25	54	942	0	160	153	69	2264
05:00 PM	204	30	5	8	294	0	56	51	4	652
05:15 PM	239	38	4	15	307	0	42	28	4	677
05:30 PM	266	51	0	16	258	0	38	26	7	662
05:45 PM	233	56	0	16	195	0	47	27	9	583
Total	942	175	9	55	1054	0	183	132	24	2574
Grand Total	2934	691	50	279	3003	0	493	408	220	8078
Apprch %	79.8	18.8	1.4	8.5	91.5	0	44	36.4	19.6	
Total %	36.3	8.6	0.6	3.5	37.2	0	6.1	5.1	2.7	
Unshifted	2934	691	50	269	3003	0	493	408	220	8068
% Unshifted	100	100	100	96.4	100	0	100	100	100	99.9
Bank 2 (U-turns)	0	0	0	10	0	0	0	0	0	10
% Bank 2 (U-turns)	0	0	0	3.6	0	0	0	0	0	0.1

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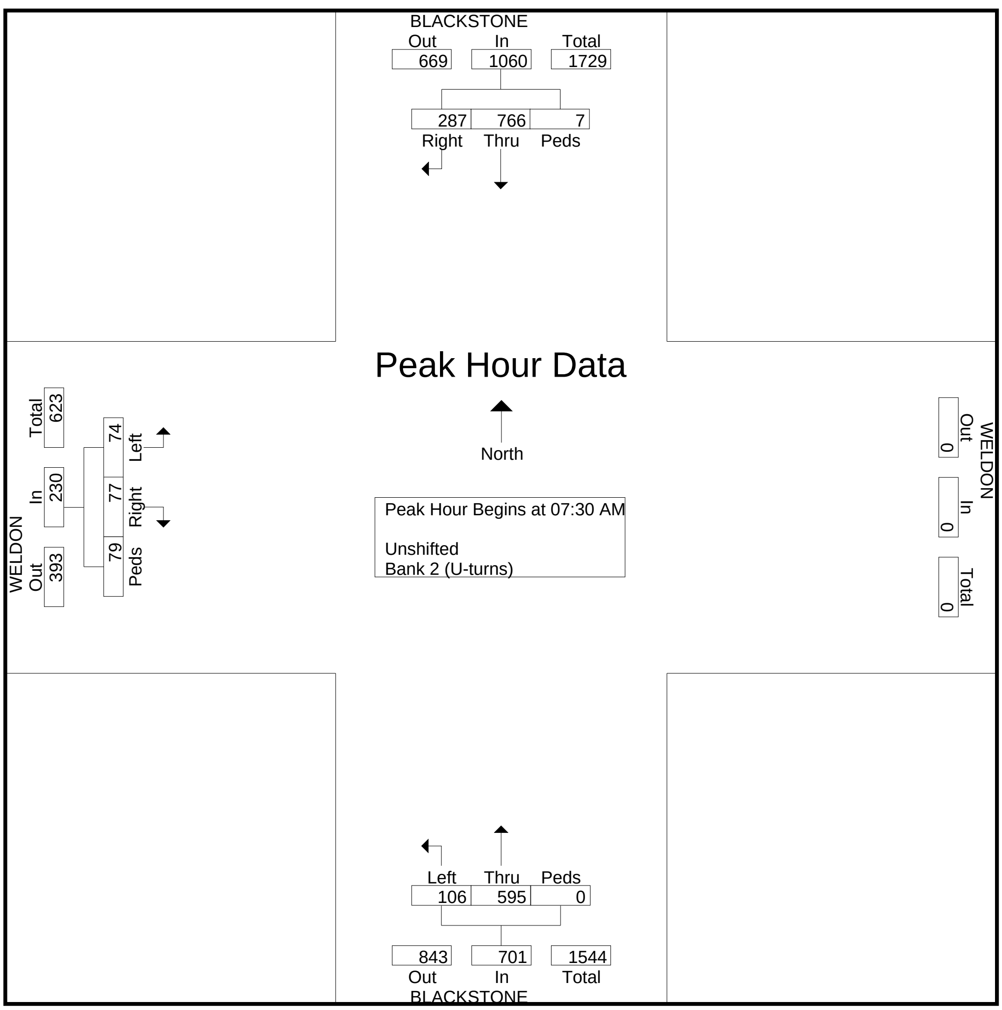
Site Code : 00000000
Start Date : 4/9/2019

	BLACKSTONE Southbound				BLACKSTONE Northbound				WELDON Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	146	79	2	227	26	122	0	148	9	4	27	40	415
07:45 AM	**240**	**110**	**4**	**354**	**34**	165	0	**199**	**30**	**27**	**37**	**94**	**647**
08:00 AM	230	66	1	297	26	**170**	0	196	20	25	5	50	543
08:15 AM	150	32	0	182	20	138	0	158	15	21	10	46	386
Total Volume	766	287	7	1060	106	595	0	701	74	77	79	230	1991
% App. Total	72.3	27.1	0.7		15.1	84.9	0		32.2	33.5	34.3		
PHF	.798	.652	.438	.749	.779	.875	.000	.881	.617	.713	.534	.612	.769



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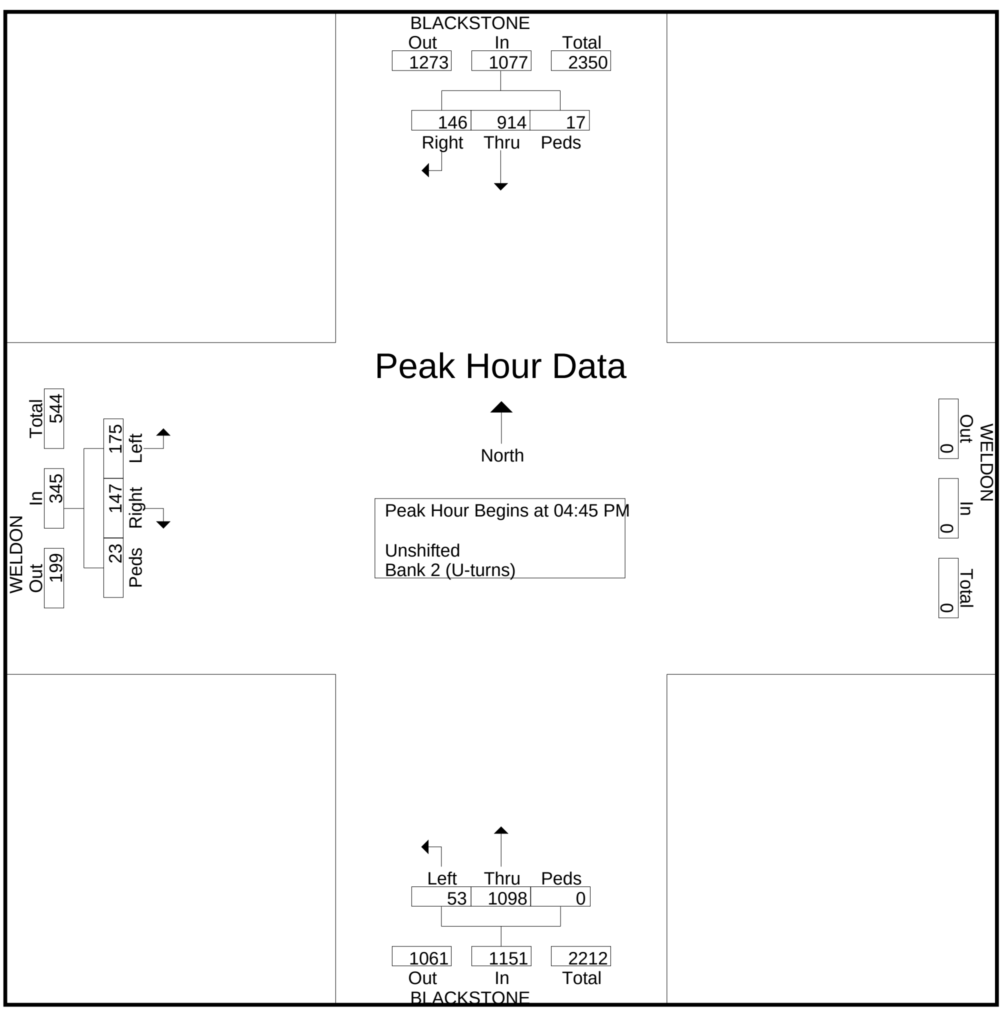
File Name : Blackstone at Weldon
Site Code : 00000000
Start Date : 4/9/2019

	BLACKSTONE Southbound				BLACKSTONE Northbound				WELDON Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	205	27	**8**	240	14	239	0	253	39	42	**8**	89	582
05:00 PM	204	30	5	239	8	294	0	302	**56**	**51**	4	**111**	652
05:15 PM	239	38	4	281	15	**307**	0	**322**	42	28	4	74	**677**
05:30 PM	**266**	**51**	0	**317**	**16**	258	0	274	38	26	7	71	662
Total Volume	914	146	17	1077	53	1098	0	1151	175	147	23	345	2573
% App. Total	84.9	13.6	1.6		4.6	95.4	0		50.7	42.6	6.7		
PHF	.859	.716	.531	.849	.828	.894	.000	.894	.781	.721	.719	.777	.950



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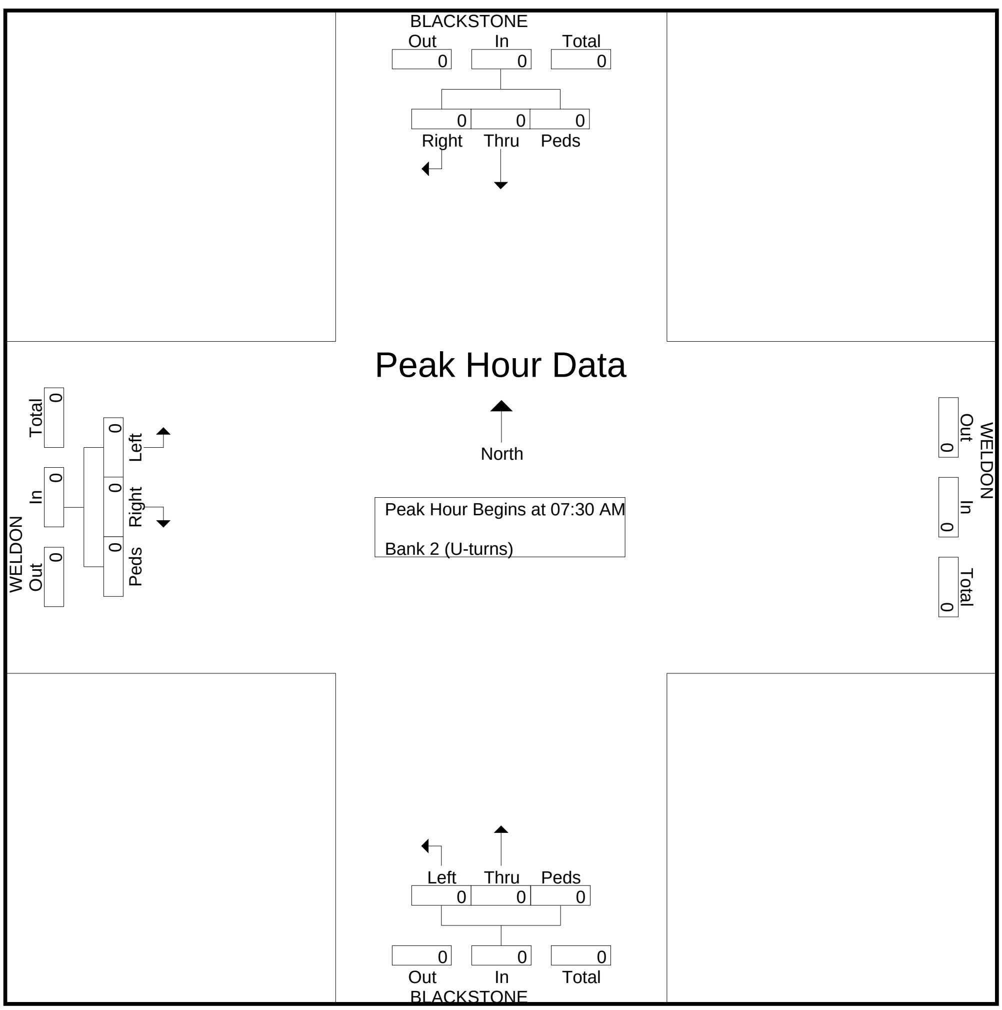
	BLACKSTONE Southbound				BLACKSTONE Northbound				WELDON Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



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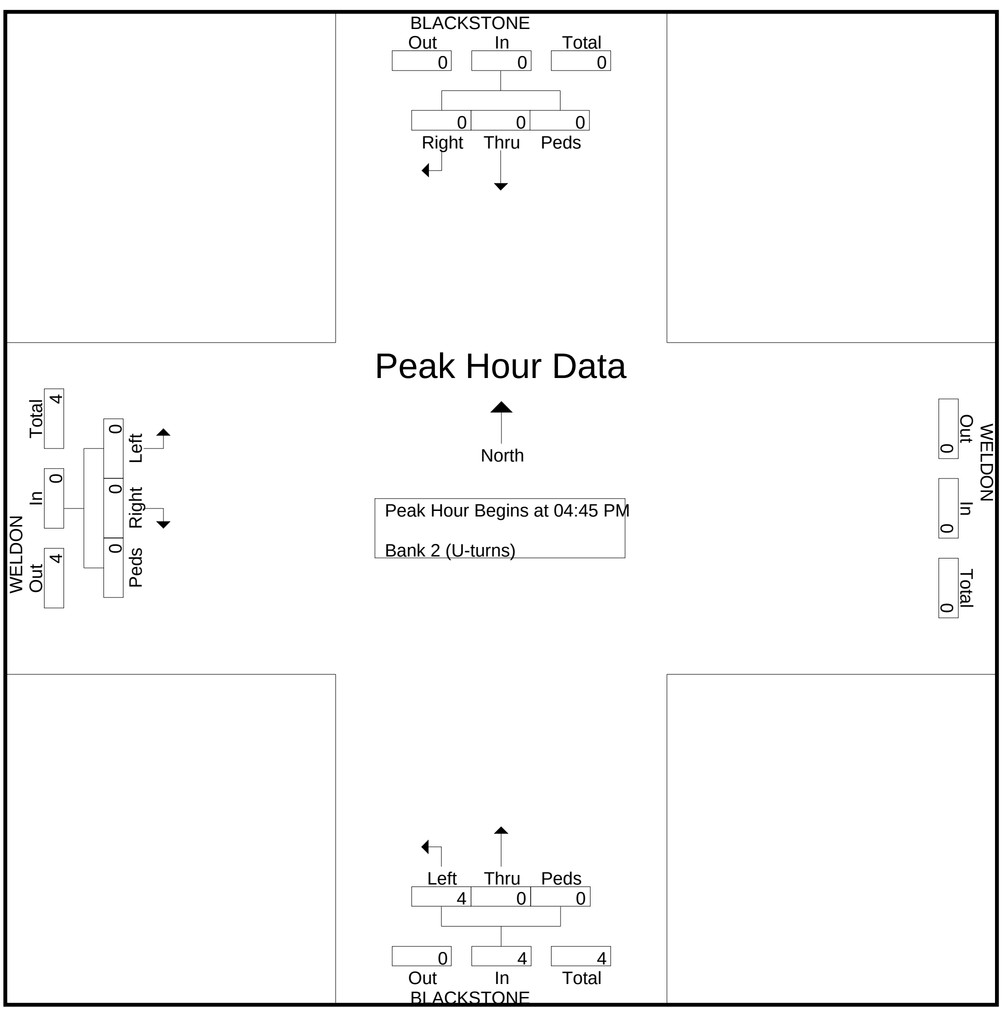
	BLACKSTONE Southbound				BLACKSTONE Northbound				WELDON Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
05:15 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	**2**	0	0	**2**	0	0	0	0	**2**
Total Volume	0	0	0	0	4	0	0	4	0	0	0	0	4
% App. Total	0	0	0		100	0	0		0	0	0		
PHF	.000	.000	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.500



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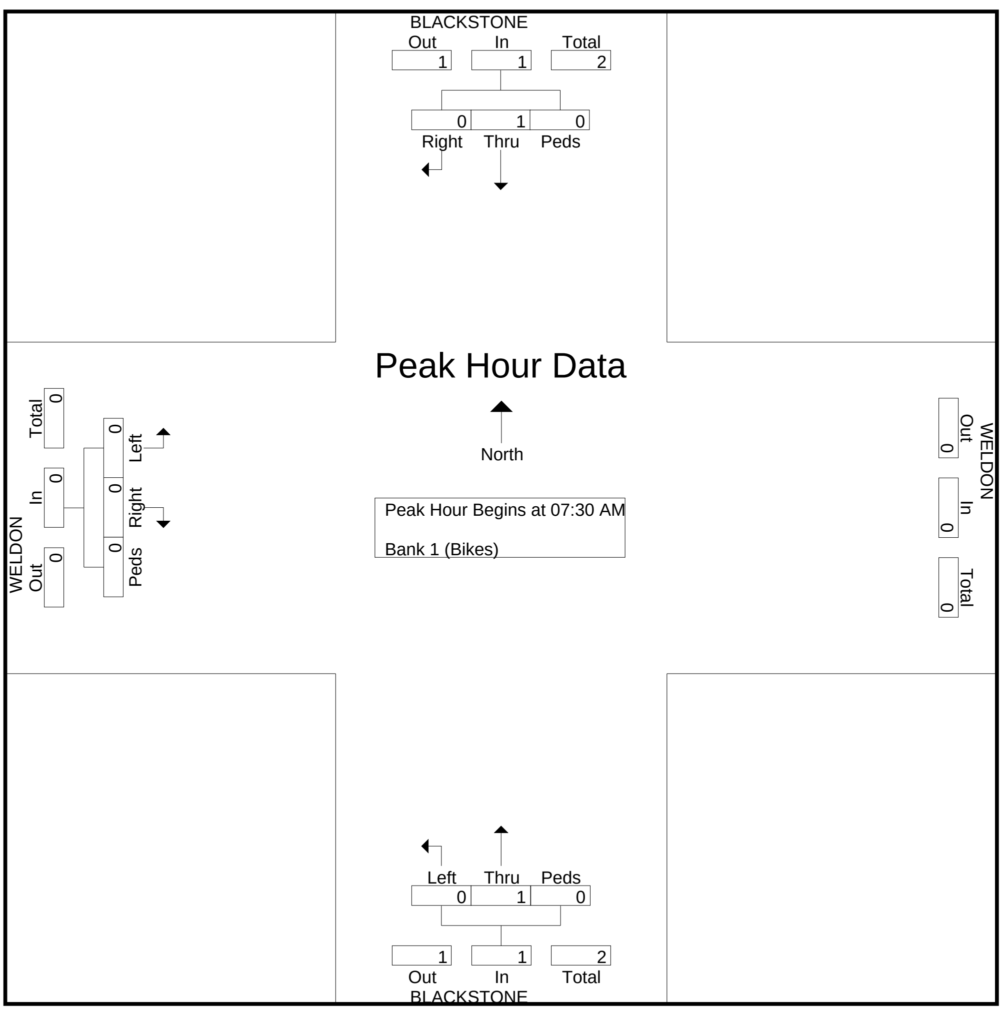
	BLACKSTONE Southbound				BLACKSTONE Northbound				WELDON Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	**1**	0	0	**1**	0	0	0	0	0	0	0	0	**1**
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	1
Total Volume	1	0	0	1	0	1	0	1	0	0	0	0	2
% App. Total	100	0	0		0	100	0		0	0	0		
PHF	.250	.000	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000	.500



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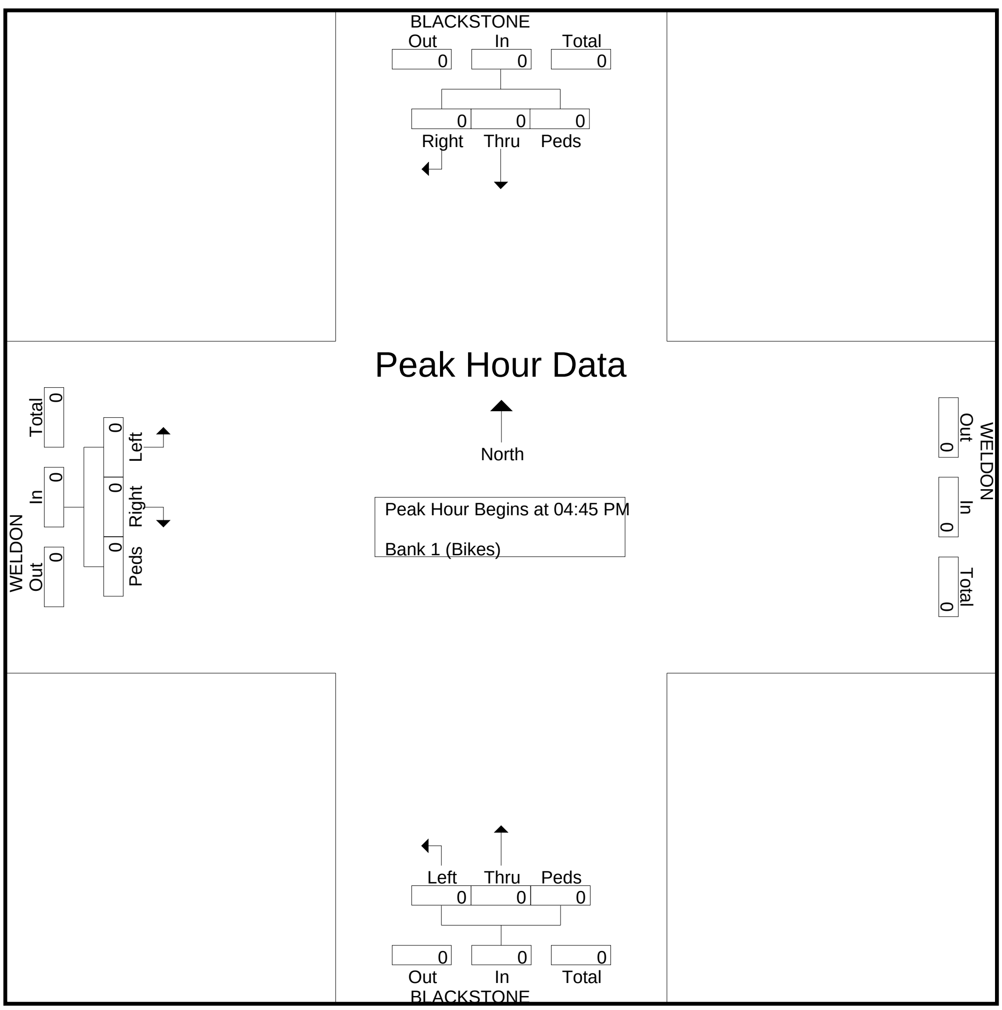
	BLACKSTONE Southbound				BLACKSTONE Northbound				WELDON Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



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Groups Printed- Unshifted - turns)

	BLACKSTONE Southbound				UNIVERSITY Westbound				BLACKSTONE Northbound				UNIVERSITY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00 AM	6	89	4	3	0	3	0	0	14	75	4	0	1	0	8	0	207
07:15 AM	6	126	3	0	1	3	11	0	28	99	11	0	0	0	4	0	292
07:30 AM	5	178	1	9	4	1	13	0	32	164	7	0	0	0	7	0	421
07:45 AM	9	236	16	0	1	5	17	0	43	210	14	0	1	0	17	0	569
Total	26	629	24	12	6	12	41	0	117	548	36	0	2	0	36	0	1489
08:00 AM	8	223	7	3	0	4	12	0	29	186	8	0	0	1	11	2	494
08:15 AM	5	182	6	1	0	1	3	0	24	160	6	2	0	0	13	0	403
08:30 AM	5	132	12	0	2	0	4	0	21	165	6	2	0	0	12	0	361
08:45 AM	8	155	7	0	2	0	3	3	29	166	8	2	0	0	23	0	406
Total	26	692	32	4	4	5	22	3	103	677	28	6	0	1	59	2	1664
******																	
04:00 PM	5	192	6	6	1	0	18	0	16	231	4	1	3	2	25	0	510
04:15 PM	11	206	4	1	0	0	7	0	15	210	3	1	1	0	28	0	487
04:30 PM	16	207	2	3	0	1	6	0	17	262	10	2	2	0	17	0	545
04:45 PM	9	217	5	3	1	1	10	1	17	229	6	0	0	1	35	0	535
Total	41	822	17	13	2	2	41	1	65	932	23	4	6	3	105	0	2077
05:00 PM	17	229	3	1	3	2	10	0	17	262	7	3	1	1	25	0	581
05:15 PM	21	242	4	0	5	0	23	0	13	311	6	2	0	0	23	0	650
05:30 PM	11	224	1	2	13	1	15	1	26	225	9	6	2	0	21	0	557
05:45 PM	9	226	0	1	1	3	12	0	16	206	3	5	0	1	14	0	497
Total	58	921	8	4	22	6	60	1	72	1004	25	16	3	2	83	0	2285
Grand Total	151	3064	81	33	34	25	164	5	357	3161	112	26	11	6	283	2	7515
Apprch %	4.5	92	2.4	1	14.9	11	71.9	2.2	9.8	86.5	3.1	0.7	3.6	2	93.7	0.7	
Total %	2	40.8	1.1	0.4	0.5	0.3	2.2	0.1	4.8	42.1	1.5	0.3	0.1	0.1	3.8	0	
Unshifted	109	3064	81	33	34	25	164	5	284	3158	112	26	11	6	283	2	7397
% Unshifted	72.2	100	100	100	100	100	100	100	79.6	99.9	100	100	100	100	100	100	98.4
Bank 2 (U-turns)	42	0	0	0	0	0	0	0	73	3	0	0	0	0	0	0	118
% Bank 2 (U-turns)	27.8	0	0	0	0	0	0	0	20.4	0.1	0	0	0	0	0	0	1.6

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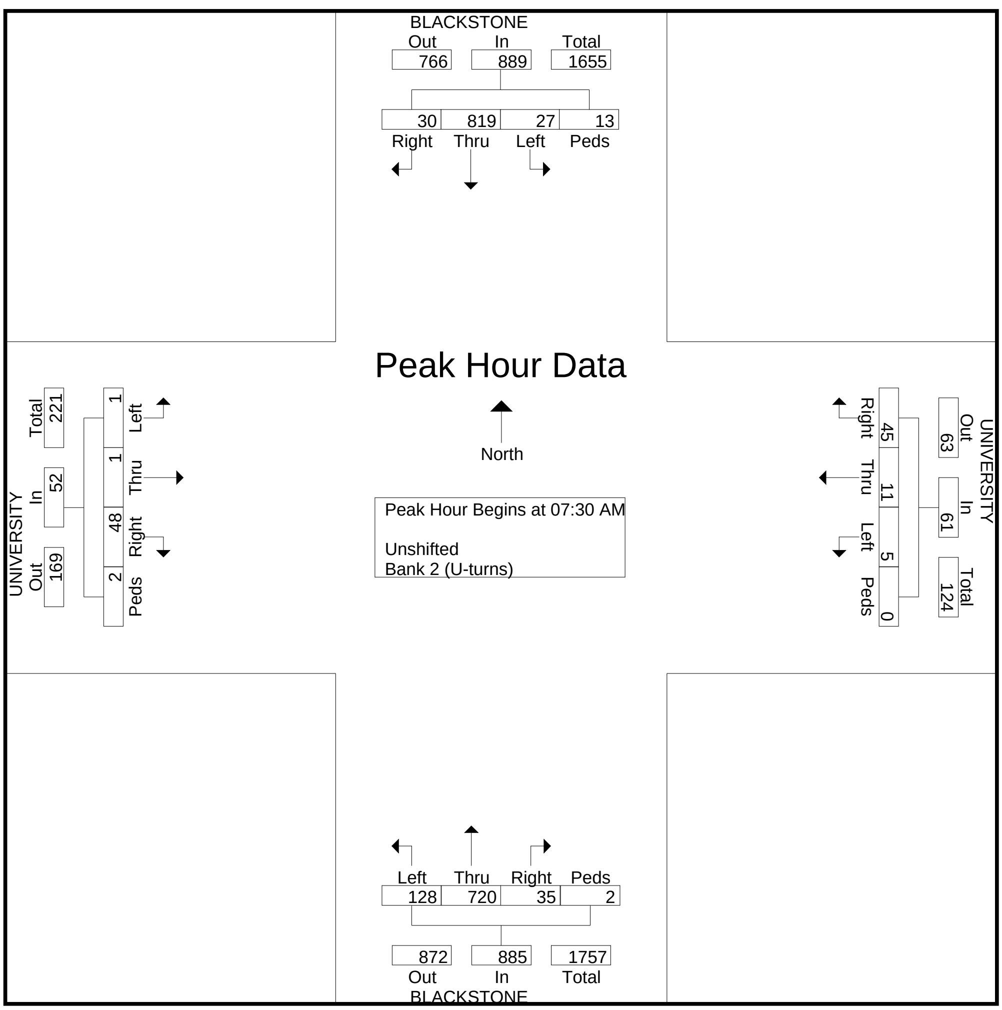
	BLACKSTONE Southbound					UNIVERSITY Westbound					BLACKSTONE Northbound					UNIVERSITY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	5	178	1	**9**	193	**4**	1	13	0	18	32	164	7	0	203	0	0	7	0	7	421
07:45 AM	**9**	**236**	**16**	0	**261**	1	**5**	**17**	0	**23**	**43**	**210**	**14**	0	**267**	**1**	0	**17**	0	**18**	**569**
08:00 AM	8	223	7	3	241	0	4	12	0	16	29	186	8	0	223	0	**1**	11	**2**	14	494
08:15 AM	5	182	6	1	194	0	1	3	0	4	24	160	6	**2**	192	0	0	13	0	13	403
Total Volume	27	819	30	13	889	5	11	45	0	61	128	720	35	2	885	1	1	48	2	52	1887
% App. Total	3	92.1	3.4	1.5		8.2	18	73.8	0		14.5	81.4	4	0.2		1.9	1.9	92.3	3.8		
PHF	.750	.868	.469	.361	.852	.313	.550	.662	.000	.663	.744	.857	.625	.250	.829	.250	.250	.706	.250	.722	.829



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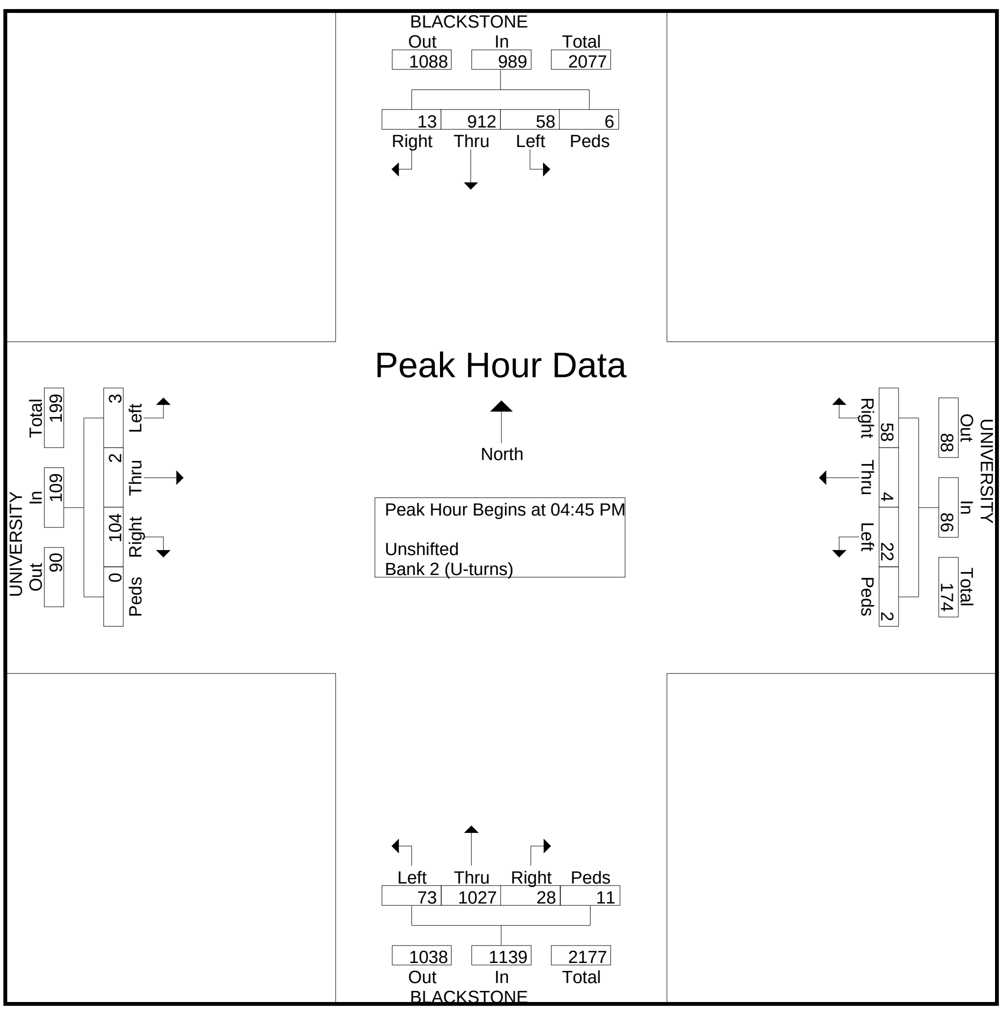
	BLACKSTONE Southbound					UNIVERSITY Westbound					BLACKSTONE Northbound					UNIVERSITY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	9	217	**5**	**3**	234	1	1	10	**1**	13	17	229	6	0	252	0	**1**	**35**	0	**36**	535
05:00 PM	17	229	3	1	250	3	**2**	10	0	15	17	262	7	3	289	1	1	25	0	27	581
05:15 PM	**21**	**242**	4	0	**267**	5	0	**23**	0	28	13	**311**	6	2	**332**	0	0	23	0	23	**650**
05:30 PM	11	224	1	2	238	**13**	1	15	1	**30**	**26**	225	**9**	**6**	266	**2**	0	21	0	23	557
Total Volume	58	912	13	6	989	22	4	58	2	86	73	1027	28	11	1139	3	2	104	0	109	2323
% App. Total	5.9	92.2	1.3	0.6		25.6	4.7	67.4	2.3		6.4	90.2	2.5	1		2.8	1.8	95.4	0		
PHF	.690	.942	.650	.500	.926	.423	.500	.630	.500	.717	.702	.826	.778	.458	.858	.375	.500	.743	.000	.757	.893



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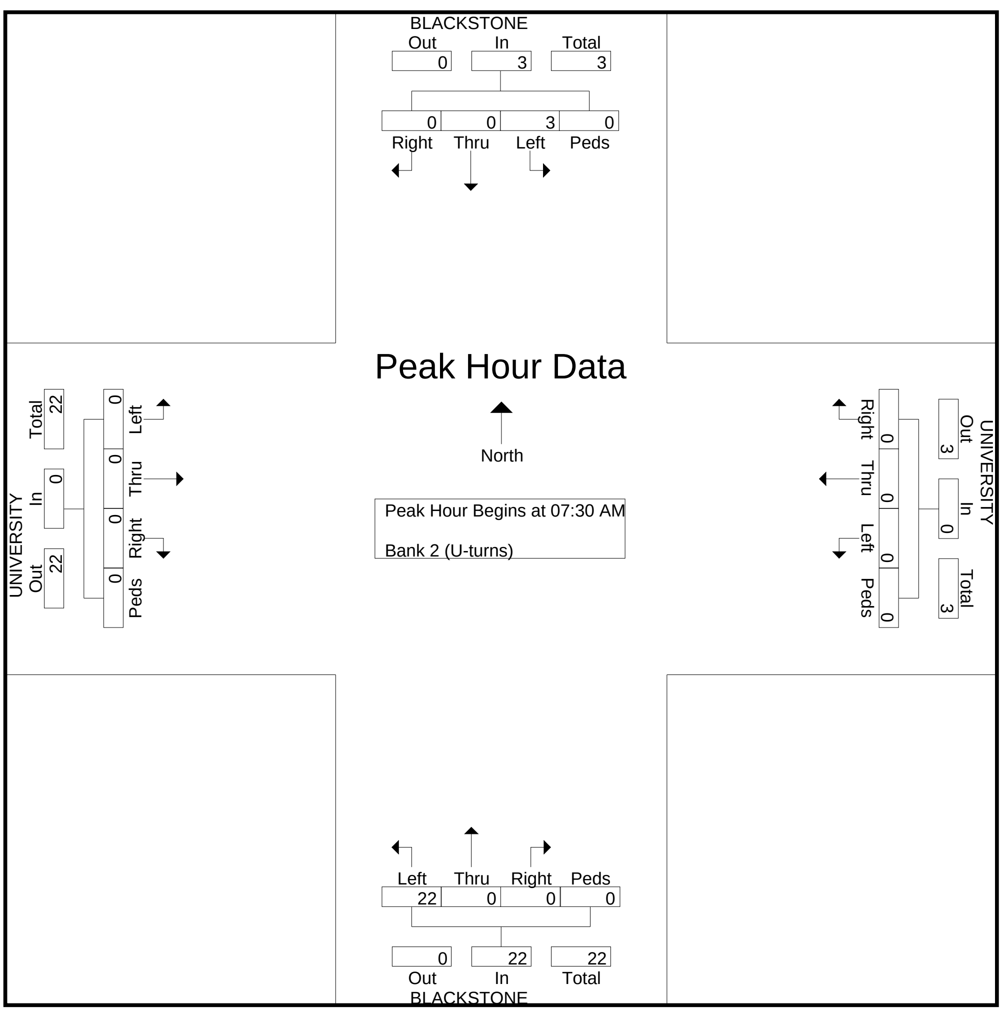
	BLACKSTONE Southbound					UNIVERSITY Westbound					BLACKSTONE Northbound					UNIVERSITY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	5
07:45 AM	**1**	0	0	0	**1**	0	0	0	0	0	**10**	0	0	0	**10**	0	0	0	0	0	**11**
08:00 AM	1	0	0	0	1	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	4
08:15 AM	1	0	0	0	1	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	5
Total Volume	3	0	0	0	3	0	0	0	0	0	22	0	0	0	22	0	0	0	0	0	25
% App. Total	100	0	0	0		0	0	0	0		100	0	0	0		0	0	0	0		
PHF	.750	.000	.000	.000	.750	.000	.000	.000	.000	.000	.550	.000	.000	.000	.550	.000	.000	.000	.000	.000	.568



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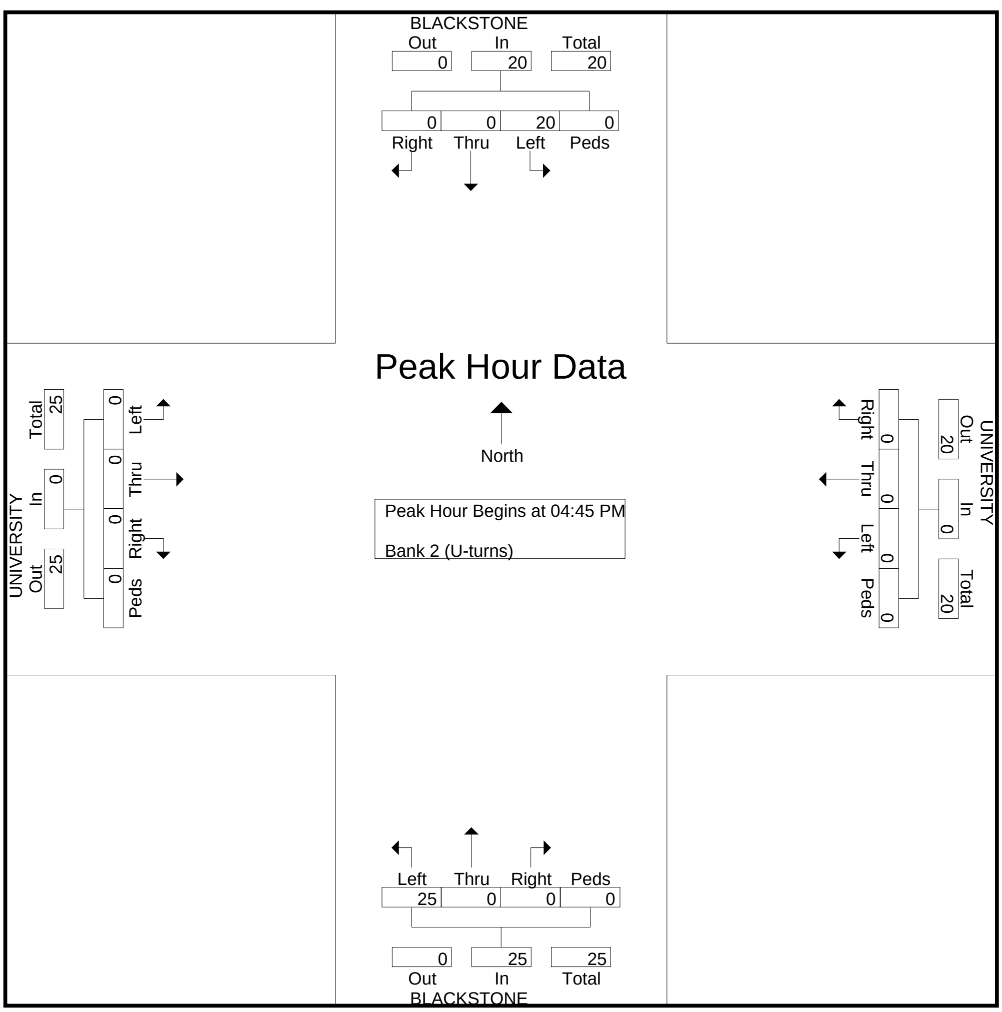
	BLACKSTONE Southbound					UNIVERSITY Westbound					BLACKSTONE Northbound					UNIVERSITY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	1	0	0	0	1	0	0	0	0	0	6	0	0	0	6	0	0	0	0	0	7
05:00 PM	6	0	0	0	6	0	0	0	0	0	6	0	0	0	6	0	0	0	0	0	12
05:15 PM	**7**	0	0	0	**7**	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	11
05:30 PM	6	0	0	0	6	0	0	0	0	0	**9**	0	0	0	**9**	0	0	0	0	0	**15**
Total Volume	20	0	0	0	20	0	0	0	0	0	25	0	0	0	25	0	0	0	0	0	45
% App. Total	100	0	0	0		0	0	0	0		100	0	0	0		0	0	0	0		
PHF	.714	.000	.000	.000	.714	.000	.000	.000	.000	.000	.694	.000	.000	.000	.694	.000	.000	.000	.000	.000	.750



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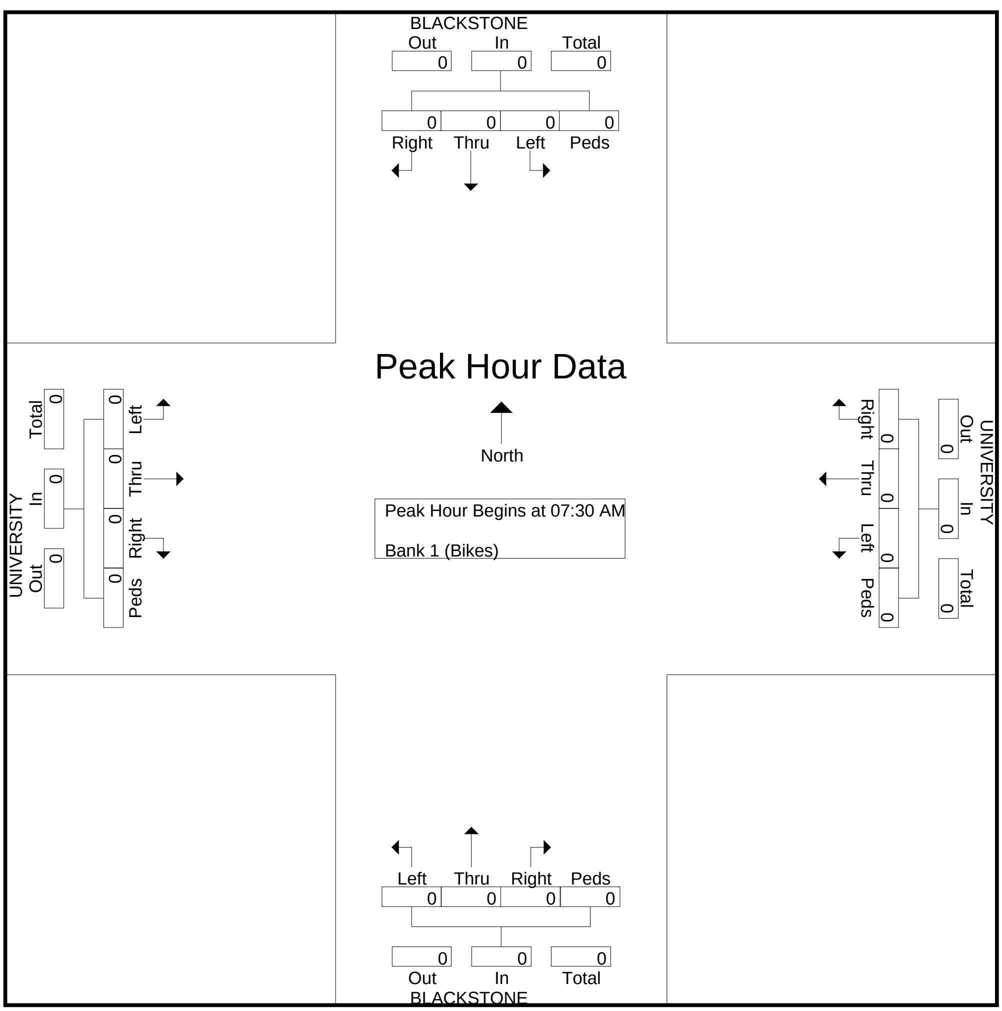
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



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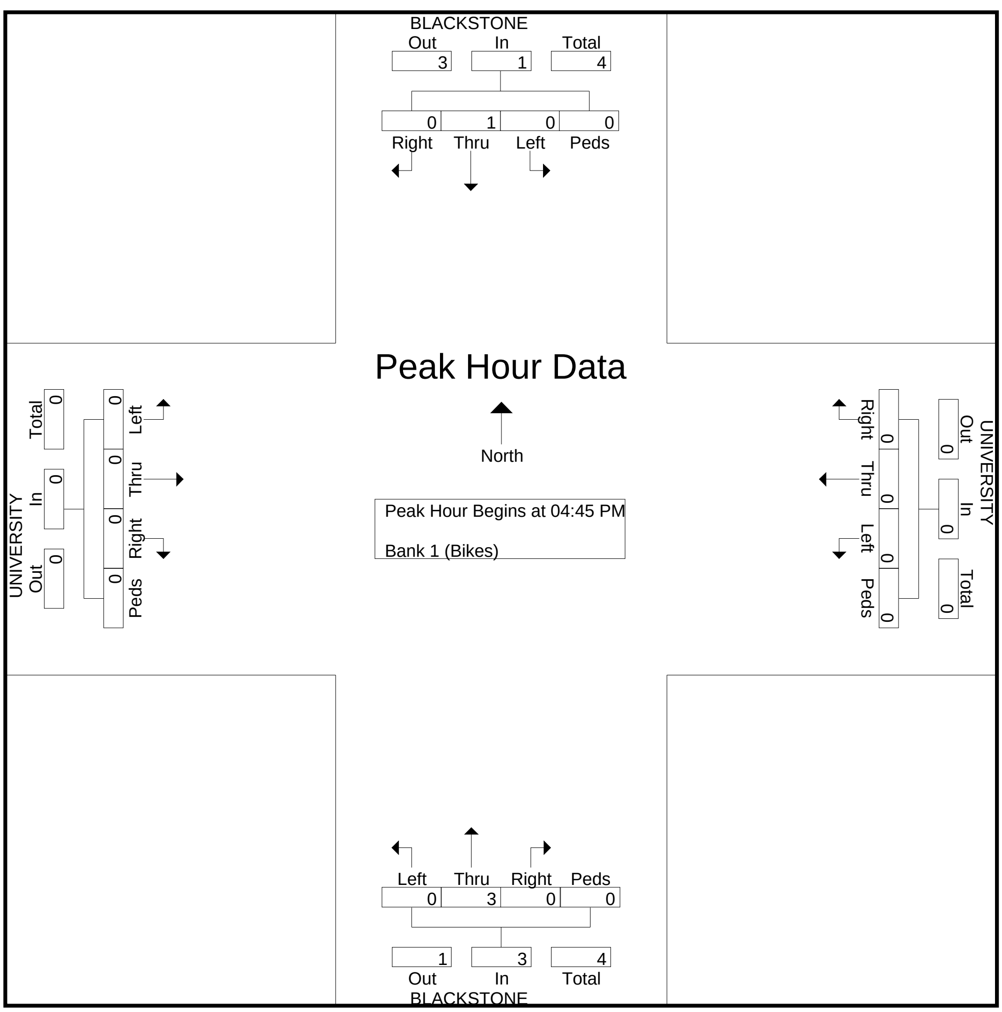
Start Date : 4/10/2019
Page No : 3

	BLACKSTONE Southbound					UNIVERSITY Westbound					BLACKSTONE Northbound					UNIVERSITY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	**1**	0	0	**1**	0	0	0	0	0	0	**2**	0	0	**2**	0	0	0	0	0	**3**
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total Volume	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.375	.000	.000	.375	.000	.000	.000	.000	.000	.333



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:
JLB Traffic Engineering, Inc.
1300 E. Shaw Ave, Suite 103
Fresno, CA

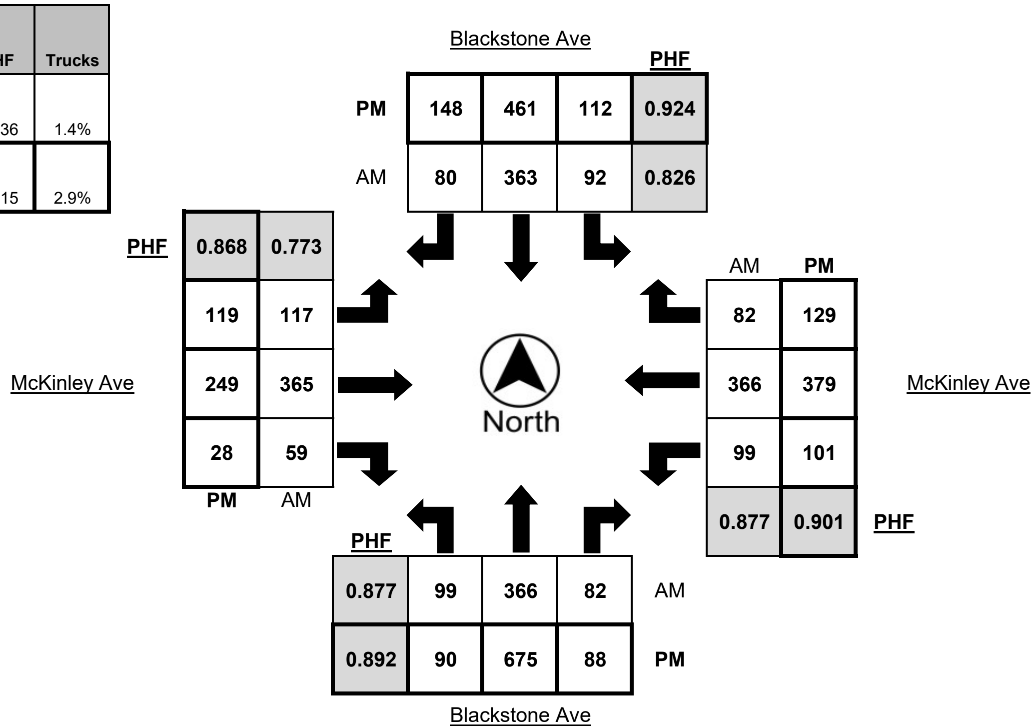
LOCATION	Blackstone Ave @ McKinley Ave	**LATITUDE**	36.7651
COUNTY	Fresno	**LONGITUDE**	-119.7905
COLLECTION DATE	Wednesday, June 5, 2019	**WEATHER**	Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	19	32	13	3	7	40	13	0	16	43	10	4	19	32	13	0
7:15 AM - 7:30 AM	12	51	14	1	12	72	10	1	25	64	8	8	12	61	14	1
7:30 AM - 7:45 AM	20	110	12	2	16	78	19	2	30	90	13	5	20	110	12	2
7:45 AM - 8:00 AM	20	116	20	0	36	100	26	1	36	122	17	5	20	116	20	0
8:00 AM - 8:15 AM	24	82	21	2	29	95	17	1	33	91	13	4	24	82	21	2
8:15 AM - 8:30 AM	35	58	29	0	11	90	18	0	18	62	16	4	35	58	29	0
8:30 AM - 8:45 AM	19	59	25	4	19	77	31	3	17	51	5	2	19	59	25	4
8:45 AM - 9:00 AM	41	83	24	2	11	65	12	0	14	67	7	8	41	83	24	2
TOTAL	**190**	**591**	**158**	**14**	**141**	**617**	**146**	**8**	**189**	**590**	**89**	**40**	**190**	**601**	**158**	**11**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	10	133	17	12	30	128	29	1	24	52	11	4	28	102	37	3
4:15 PM - 4:30 PM	10	138	23	6	40	93	44	8	30	54	10	6	23	85	40	1
4:30 PM - 4:45 PM	18	162	22	15	25	124	35	3	21	61	12	4	28	84	32	1
4:45 PM - 5:00 PM	20	164	18	12	25	88	35	6	27	50	9	2	26	90	31	0
5:00 PM - 5:15 PM	27	161	22	11	30	120	44	1	37	73	4	1	28	96	25	1
5:15 PM - 5:30 PM	25	188	26	11	32	129	34	3	34	65	3	2	19	109	41	2
5:30 PM - 5:45 PM	22	147	17	10	28	141	35	2	27	58	11	4	26	70	33	2
5:45 PM - 6:00 PM	20	122	15	7	30	129	24	2	24	62	13	0	11	66	36	2
TOTAL	**152**	**1215**	**160**	**84**	**240**	**952**	**280**	**26**	**224**	**475**	**73**	**23**	**189**	**702**	**275**	**12**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:30 AM - 8:30 AM	99	366	82	4	92	363	80	4	117	365	59	18	99	366	82	4
4:30 PM - 5:30 PM	90	675	88	49	112	461	148	13	119	249	28	9	101	379	129	4

	PHF	**Trucks**
AM	0.836	1.4%
PM	0.915	2.9%



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Turning Movement Report

Prepared For:
JLB Traffic Engineering, Inc.
1300 E. Shaw Ave, Suite 103
Fresno, CA

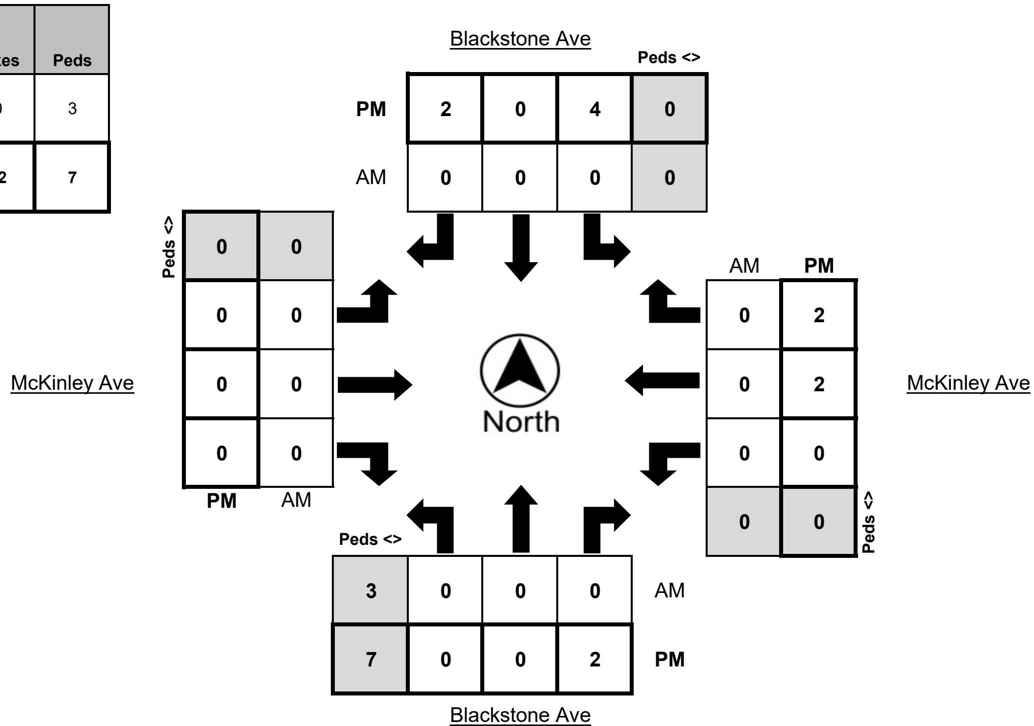
LOCATION	Blackstone Ave @ McKinley Ave	**LATITUDE**	36.7651
COUNTY	Fresno	**LONGITUDE**	-119.7905
COLLECTION DATE	Wednesday, June 5, 2019	**WEATHER**	Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM - 7:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	1	1	0	0	0	0	2	0	0	0	0	0	0	0	0
TOTAL	**0**	**2**	**3**	**1**	**0**	**1**	**0**	**6**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
4:00 PM - 4:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	1	0	1	0	0	2	0	0	0	0	0	1	1	0
4:45 PM - 5:00 PM	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	1	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0
5:30 PM - 5:45 PM	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0
TOTAL	**0**	**0**	**4**	**0**	**4**	**0**	**2**	**11**	**2**	**0**	**0**	**0**	**0**	**5**	**2**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:30 AM - 8:30 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
4:30 PM - 5:30 PM	0	0	2	0	4	0	2	7	0	0	0	0	0	2	2	0

	Bikes	Peds
AM Peak Total	0	3
PM Peak Total	12	7



Metro Traffic Data Inc.
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Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

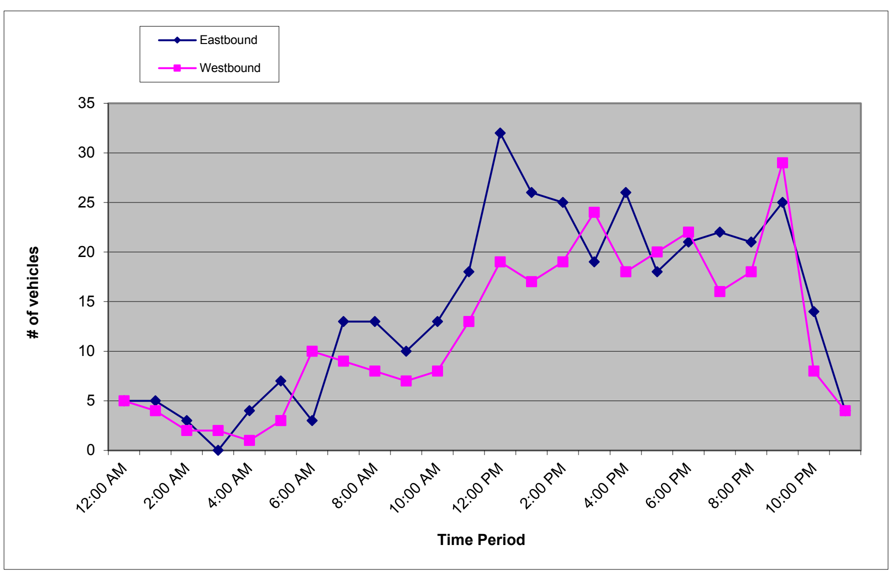
24 Hour Volume Report

Prepared For: **JLB Traffic Engineering, Inc.**
1300 E. Shaw Ave, Suite 103
Fresno, CA

LOCATION	Cambridge Ave w/o Blackstone Ave	**LATITUDE**	36.7695441
COUNTY	Fresno	**LONGITUDE**	-119.7912379
COLLECTION DATE	Wednesday, June 05, 2019	**WEATHER**	Clear
NUMBER OF LANES	2		

	Eastbound					Westbound					Hourly
Hour	:00	:15	:30	:45	**Total**	:00	:15	:30	:45	**Total**	**Totals**
12:00 AM	4	0	0	1	**5**	3	1	1	0	**5**	**10**
1:00 AM	1	0	3	1	**5**	0	0	2	2	**4**	**9**
2:00 AM	2	0	0	1	**3**	0	1	0	1	**2**	**5**
3:00 AM	0	0	0	0	**0**	1	0	0	1	**2**	**2**
4:00 AM	0	1	0	3	**4**	0	0	1	0	**1**	**5**
5:00 AM	0	1	3	3	**7**	1	0	0	2	**3**	**10**
6:00 AM	0	0	0	3	**3**	1	1	1	7	**10**	**13**
7:00 AM	2	2	5	4	**13**	2	1	1	5	**9**	**22**
8:00 AM	3	4	4	2	**13**	1	2	4	1	**8**	**21**
9:00 AM	2	1	3	4	**10**	2	4	1	0	**7**	**17**
10:00 AM	4	2	2	5	**13**	2	0	1	5	**8**	**21**
11:00 AM	3	3	7	5	**18**	1	5	3	4	**13**	**31**
12:00 PM	9	5	9	9	**32**	7	5	7	0	**19**	**51**
1:00 PM	6	7	5	8	**26**	4	6	2	5	**17**	**43**
2:00 PM	2	5	5	13	**25**	5	6	4	4	**19**	**44**
3:00 PM	3	5	8	3	**19**	4	5	5	10	**24**	**43**
4:00 PM	4	8	7	7	**26**	2	3	8	5	**18**	**44**
5:00 PM	5	3	2	8	**18**	5	2	5	8	**20**	**38**
6:00 PM	6	10	2	3	**21**	5	10	5	2	**22**	**43**
7:00 PM	6	6	5	5	**22**	5	3	5	3	**16**	**38**
8:00 PM	2	7	8	4	**21**	4	4	3	7	**18**	**39**
9:00 PM	6	8	7	4	**25**	11	7	7	4	**29**	**54**
10:00 PM	7	4	1	2	**14**	3	2	3	0	**8**	**22**
11:00 PM	4	0	0	0	**4**	2	1	1	0	**4**	**8**
Total	**54.8%**				**347**	**45.2%**				**286**	
	633										

AM%	**26.2%**	**AM Peak 32**	**10:45 am to 11:45 am**	**AM P.H.F.**	**0.80**
PM%	**73.8%**	**PM Peak 57**	**8:45 pm to 9:45 pm**	**PM P.H.F.**	**0.84**



24 Hour Volume Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

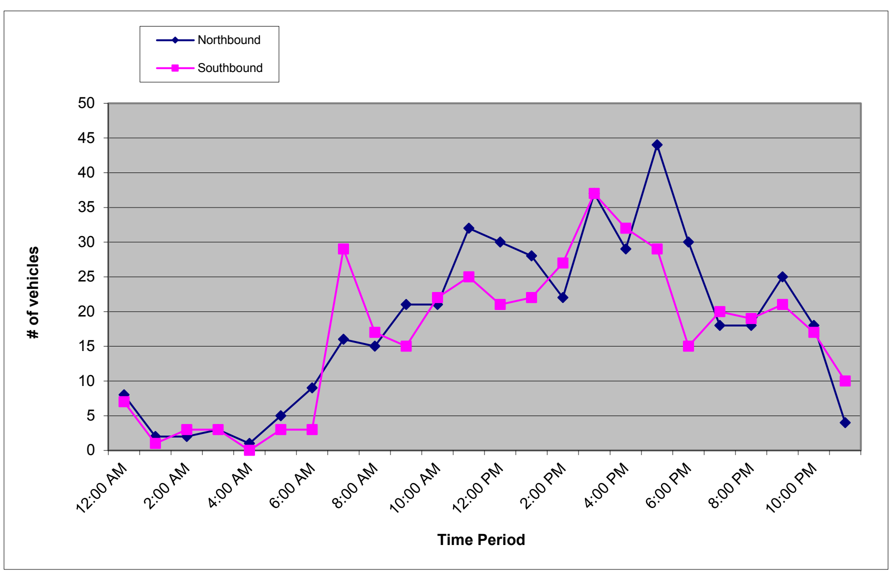
800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: **JLB Traffic Engineering, Inc.**
1300 E. Shaw Ave, Suite 103
Fresno, CA

LOCATION Glenn Ave s/o Clinton Ave
LATITUDE 36.7718076
COUNTY Fresno
LONGITUDE -119.7933795
COLLECTION DATE Wednesday, June 05, 2019
WEATHER Clear
NUMBER OF LANES 2

	Northbound					Southbound					Hourly
Hour	:00	:15	:30	:45	**Total**	:00	:15	:30	:45	**Total**	**Totals**
12:00 AM	0	4	3	1	**8**	2	3	2	0	**7**	**15**
1:00 AM	1	1	0	0	**2**	1	0	0	0	**1**	**3**
2:00 AM	0	0	0	2	**2**	1	1	0	1	**3**	**5**
3:00 AM	1	0	2	0	**3**	0	0	2	1	**3**	**6**
4:00 AM	0	0	0	1	**1**	0	0	0	0	**0**	**1**
5:00 AM	1	0	1	3	**5**	3	0	0	0	**3**	**8**
6:00 AM	1	1	3	4	**9**	1	0	1	1	**3**	**12**
7:00 AM	5	4	3	4	**16**	10	0	9	10	**29**	**45**
8:00 AM	6	3	1	5	**15**	8	4	2	3	**17**	**32**
9:00 AM	8	6	6	1	**21**	3	4	3	5	**15**	**36**
10:00 AM	1	7	7	6	**21**	4	5	8	5	**22**	**43**
11:00 AM	9	2	9	12	**32**	5	8	6	6	**25**	**57**
12:00 PM	5	6	10	9	**30**	1	6	9	5	**21**	**51**
1:00 PM	6	4	7	11	**28**	8	4	4	6	**22**	**50**
2:00 PM	2	2	7	11	**22**	6	10	3	8	**27**	**49**
3:00 PM	5	10	12	10	**37**	9	7	14	7	**37**	**74**
4:00 PM	8	7	7	7	**29**	5	5	9	13	**32**	**61**
5:00 PM	9	21	6	8	**44**	5	6	11	7	**29**	**73**
6:00 PM	10	6	7	7	**30**	4	3	5	3	**15**	**45**
7:00 PM	5	6	5	2	**18**	8	5	4	3	**20**	**38**
8:00 PM	3	1	3	11	**18**	5	6	4	4	**19**	**37**
9:00 PM	7	8	8	2	**25**	8	2	8	3	**21**	**46**
10:00 PM	3	10	1	4	**18**	6	4	3	4	**17**	**35**
11:00 PM	2	0	1	1	**4**	2	0	6	2	**10**	**14**
Total	**52.4%**				**438**	**47.6%**				**398**	
	836										

AM%	**31.5%**	**AM Peak 57**	**11:00 am to 12:00 pm**	**AM P.H.F.**	**0.79**
PM%	**68.5%**	**PM Peak 76**	**2:45 pm to 3:45 pm**	**PM P.H.F.**	**0.73**



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24 Hour Volume Report

Prepared For: **JLB Traffic Engineering, Inc.**
1300 E. Shaw Ave, Suite 103
Fresno, CA

LOCATION San Pablo Ave s/o Clinton Ave

LATITUDE 36.771822

COUNTY Fresno

LONGITUDE -119.7945014

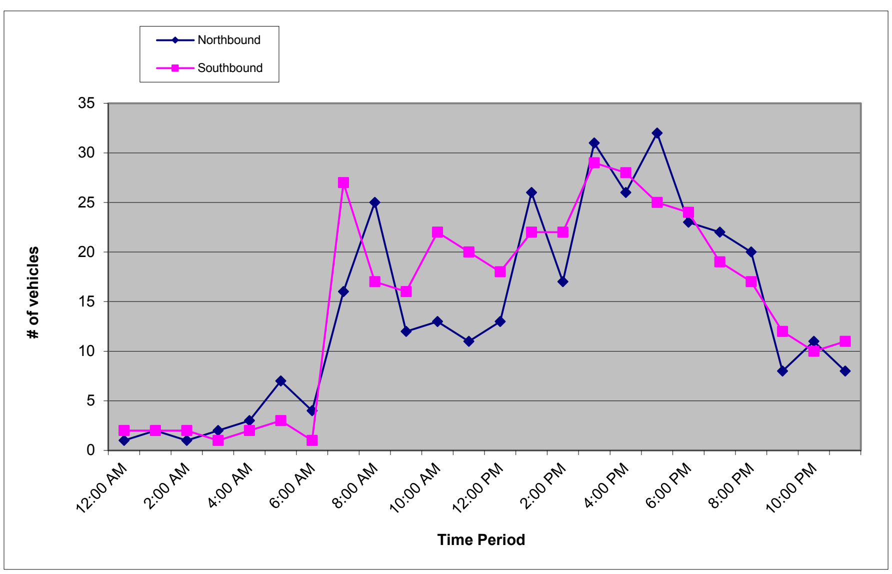
COLLECTION DATE Wednesday, June 05, 2019

WEATHER Clear

NUMBER OF LANES 2

	Northbound					Southbound					Hourly
Hour	:00	:15	:30	:45	**Total**	:00	:15	:30	:45	**Total**	**Totals**
12:00 AM	0	0	1	0	**1**	0	1	1	0	**2**	**3**
1:00 AM	1	1	0	0	**2**	0	2	0	0	**2**	**4**
2:00 AM	1	0	0	0	**1**	2	0	0	0	**2**	**3**
3:00 AM	0	1	1	0	**2**	1	0	0	0	**1**	**3**
4:00 AM	0	0	1	2	**3**	0	0	0	2	**2**	**5**
5:00 AM	1	1	5	0	**7**	0	1	0	2	**3**	**10**
6:00 AM	0	1	2	1	**4**	1	0	0	0	**1**	**5**
7:00 AM	3	6	2	5	**16**	6	3	15	3	**27**	**43**
8:00 AM	3	6	8	8	**25**	7	3	3	4	**17**	**42**
9:00 AM	1	2	6	3	**12**	5	4	2	5	**16**	**28**
10:00 AM	5	3	3	2	**13**	8	6	2	6	**22**	**35**
11:00 AM	2	3	4	2	**11**	5	2	6	7	**20**	**31**
12:00 PM	3	0	6	4	**13**	7	2	2	7	**18**	**31**
1:00 PM	6	3	5	12	**26**	5	2	4	11	**22**	**48**
2:00 PM	5	3	5	4	**17**	8	1	9	4	**22**	**39**
3:00 PM	7	3	11	10	**31**	8	9	9	3	**29**	**60**
4:00 PM	5	7	9	5	**26**	9	9	5	5	**28**	**54**
5:00 PM	4	6	7	15	**32**	6	9	2	8	**25**	**57**
6:00 PM	4	5	9	5	**23**	6	9	3	6	**24**	**47**
7:00 PM	4	7	4	7	**22**	5	5	4	5	**19**	**41**
8:00 PM	2	3	9	6	**20**	4	6	4	3	**17**	**37**
9:00 PM	1	4	2	1	**8**	2	3	4	3	**12**	**20**
10:00 PM	4	0	4	3	**11**	3	3	2	2	**10**	**21**
11:00 PM	1	0	4	3	**8**	4	4	2	1	**11**	**19**
Total	**48.7%**				**334**	**51.3%**				**352**	
	686										

AM%	**30.9%**	**AM Peak 44**	**7:30 am to 8:30 am**	**AM P.H.F.**	**0.65**
PM%	**69.1%**	**PM Peak 63**	**3:30 pm to 4:30 pm**	**PM P.H.F.**	**0.79**



Appendix C: Traffic Modeling

May 31, 2018

Kai Han, TE
Council of Fresno County Governments
2035 Tulare Street, Suite 201
Fresno, CA 93721

Via E-mail Only: khan@fresnocog.org

Subject: Traffic Modeling Request for the Preparation of a Traffic Impact Analysis for the Fresno City College Parking and Facilities Expansion Project in the City of Fresno (JLB Project 004-085)

Dear Mr. Han,

JLB Traffic Engineering, Inc. (JLB) hereby requests traffic modeling for the State Center Community College District (SCCCD) Environmental Impact Report (EIR) for the proposed Parking and Facilities Expansion Project at the Fresno City College (FCC) campus. The Project is located on and adjacent to the northeast portion of the existing FCC campus in the City of Fresno. The Project consists of the following facilities:

a) Construction of a parking structure on the south side of Cambridge Avenue west of Blackstone Avenue located north of the existing district office building. The proposed parking structure would have a capacity for up to 1,000 parking spaces, include up to five levels of parking, and include ingress/egress points at Weldon Avenue and potentially Cambridge Avenue.
b) Construction of a three-story Science Building approximately 95,000 square-foot located near the southwest corner of Blackstone Avenue and Weldon Avenue. The new Science Building is proposed to include six (6) biology labs, three (3) anatomy and physiology labs, five (5) chemistry labs, two (2) physics labs, two (2) engineering labs, a computer lab, three (3) general educational classrooms, four (4) Design Science (Middle College) classrooms, a welcome center, tutorial space, and 34 faculty offices. Surface parking would also be added adjacent to the building. Existing Maintenance and Operations facilities located in this area would be removed and relocated to a different area of the campus (see section d below).
c) Replacement of the existing one-story, 5,255 square-foot Child Development Center with a new one-story, 16,480 square-foot Child Development Center at its current location.
d) Construction of a one-story, 10,000 square-foot Maintenance and Operations building plus a parking and storage area on the west side of San Pablo Avenue northwest of the existing Health Sciences Building.
e) Repurposing of the existing District administration building located on the north side of Weldon Avenue to accommodate the SCCCD Police Department.

Development of the Project facilities would occur over the next five (5) years. Per information provided to JLB, the Project is consistent with the City of Fresno 2035 General Plan. An aerial of the Project vicinity is shown in Exhibit A.

The purpose of the TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process.

Scenarios:

The following scenarios are requested:

1. Base Year 2019 (with Link and TAZ modifications)
2. Cumulative Year 2035 plus Project Select Zone (with Link and TAZ modifications)
3. Difference between model runs 2 and 1 above

Changes and/or additions to the Model Network or TAZ's

JLB reviewed the Fresno COG model network for the Base Year 2019 and Cumulative Year 2035. Based on this review, JLB requests the following link and TAZ Network modifications. Details on the requested Link and TAZ modifications for Base Year 2019 and Cumulative Year 2035 are illustrated in Exhibit B.

LINK and TAZ MODIFICATIONS (For Base Year 2019 Scenario Only):

1. Create existing TAZ A generally located between McKinley Avenue and Weldon Avenue (see Exhibit B). Existing TAZ A shall have one TAZ connector to McKinley Avenue and another to Weldon Avenue. (Note: Existing TAZ A is being removed from the 2019 network and thus its trip generation is presented in negative numbers.)
2. Create existing TAZ B generally located west of Blackstone Avenue between Weldon Avenue and University Avenue (see Exhibit B). Existing TAZ B shall have one TAZ connector to Weldon Avenue and another to University Avenue. (Note: Existing TAZ B is being removed from the 2019 network and thus its trip generation is presented in negative numbers.)
3. Create existing TAZ C1 generally located south of Weldon Avenue and west of Blackstone Avenue (see Exhibit B). Existing TAZ C1 shall have one TAZ connector to Weldon Avenue. (Note: Existing TAZ C1 is being removed from the 2019 network and thus its trip generation is presented in negative numbers.)
4. Create existing TAZ C2 generally located west of Blackstone Avenue and between Cambridge Avenue and Weldon Avenue (see Exhibit B). Existing TAZ C2 shall have one TAZ connector to Cambridge Avenue and another to Weldon Avenue. (Note: Existing TAZ C2 is being removed from the 2019 network and thus its trip generation is presented in negative numbers.)
5. Create existing TAZ D generally located south of Weldon Avenue and west of Blackstone Avenue (see Exhibit B). Existing TAZ D shall have one TAZ connector to Weldon Avenue. (Note: Existing TAZ D is being removed from the 2019 network and thus its trip generation is presented in negative numbers.)

LINK and TAZ MODIFICATIONS (For Base Year 2019 and Cumulative Year 2035 plus Project Select Zone Scenarios):

1. Modify TAZ 965 to eliminate TAZ connector to Shields Avenue.
2. Modify TAZ 967 to eliminate TAZ connector to Shields Avenue.
3. Modify Maroa Avenue to increase northbound lanes between McKinley Avenue and Node 2597 to two lanes.

4. Create College Avenue between Clinton Avenue and Weldon Avenue. College Avenue is located approximately 650 feet east of Maroa Avenue.
   a. Classification: Local Street
   b. Lanes: One in each direction
   c. Speed: 25 MPH
5. Create Weldon Avenue between Maroa Avenue and College Avenue. Weldon Avenue is located approximately 1,320 feet south of Clinton Avenue.
   a. Classification: Local Street
   b. Lanes: One in each direction
   c. Speed: 25 MPH
6. Create San Pablo Avenue between Clinton Avenue and Cambridge Avenue. San Pablo Avenue is located approximately 1,140 feet west of Blackstone Avenue.
   a. Classification: Local Street
   b. Lanes: One in each direction
   c. Speed: 25 MPH
7. Create Glenn Avenue between Clinton Avenue and Cambridge Avenue. Glenn Avenue is located approximately 800 feet west of Blackstone Avenue.
   a. Classification: Local Street
   b. Lanes: One in each direction
   c. Speed: 25 MPH
8. Create Cambridge Avenue between San Pablo Avenue and 1,950 feet east of Blackstone Avenue. Cambridge Avenue is located approximately 1,000 feet south of Clinton Avenue.
   a. Classification: Local Street
   b. Lanes: One in each direction
   c. Speed: 25 MPH
9. Create Weldon Avenue west of Blackstone Avenue for approximately 925 feet. Weldon Avenue is located approximately 340 feet south of Cambridge Avenue.
   a. Classification: Local Street
   b. Lanes: One in each direction
   c. Speed: 25 MPH
10. Create University Avenue between Fresno Street and 460 feet west of Blackstone Avenue. University Avenue is located approximately 650 feet south of Weldon Avenue.
    a. Classification: Local Street
    b. Lanes: One in each direction
    c. Speed: 25 MPH
11. Modify TAZ 963 as follows:
    a. Eliminate existing TAZ connectors to Clinton Avenue, Maroa Avenue, and McKinley Avenue.
    b. Split existing TAZ 963 into three (3) TAZs – TAZ 963A, TAZ 963B, and TAZ 963C.
       i. Create TAZ 963A (residential land use) bounded by Clinton Avenue, the railroad, and College Avenue. TAZ 963A shall have one TAZ connector to College Avenue.

   ii. Create TAZ 963B (residential land use) bounded by Clinton Avenue, College Avenue, Weldon Avenue, and Maroa Avenue. TAZ 963B shall have TAZ connectors to Clinton Avenue, College Avenue, Weldon Avenue, and Maroa Avenue.
   iii. Create TAZ 963C (junior/community college land use) bounded by College Avenue, the railroad, McKinley Avenue, and Maroa Avenue. TAZ 963C shall have TAZ connectors to both Weldon Avenue extensions, University Avenue, McKinley Avenue, and Maroa Avenue.

12. Modify TAZ 964 as follows:
    a. Eliminate existing TAZ connectors to Clinton Avenue and Blackstone Avenue.
    b. Split existing TAZ 964 into six (6) TAZs – TAZ 964A, TAZ 964B, TAZ 964C, TAZ 964D, TAZ 964E, and TAZ 964F.
       i. Create TAZ 964A (residential land use) bounded by the railroad, Clinton Avenue, and San Pablo Avenue. TAZ 964A shall have TAZ connectors to Clinton Avenue and San Pablo Avenue.
       ii. Create TAZ 964B (residential land use) bounded by Clinton Avenue, Glenn Avenue, Cambridge Avenue, and San Pablo Avenue. TAZ 964B shall have TAZ connectors to Glenn Avenue and San Pablo Avenue.
       iii. Create TAZ 964C (residential land use) bounded by Clinton Avenue, Blackstone Avenue, Cambridge Avenue, and Glenn Avenue. TAZ 964C shall have TAZ connectors to Clinton Avenue, Blackstone Avenue, Cambridge Avenue, and Glenn Avenue.
       iv. Create TAZ 964D (junior/community college land use) bounded by the railroad, Cambridge Avenue, Blackstone Avenue, and Weldon Avenue. TAZ 964D shall have TAZ connectors to Cambridge Avenue and Weldon Avenue.
       v. Create TAZ 964E (junior/community college land use) bounded by the railroad, Weldon Avenue, Blackstone Avenue, and University Avenue. TAZ 964E shall have TAZ connectors to Weldon Avenue and University Avenue.
       vi. Create TAZ 964F (commercial land use) bounded by the railroad, University Avenue, Blackstone Avenue, and McKinley Avenue. TAZ 964F shall have TAZ connectors to University Avenue, Blackstone Avenue, and McKinley Avenue.
13. Modify TAZ 966 as follows:
    a. Eliminate existing TAZ connectors to Clinton Avenue, Blackstone Avenue, and McKinley Avenue.
    b. Split existing TAZ 966 into three (3) TAZs – TAZ 966A, TAZ 966B, and TAZ 966C.
       i. Create TAZ 966A bounded by Clinton Avenue, Blackstone Avenue, and Cambridge Avenue. TAZ 966A shall have TAZ connectors to Clinton Avenue, Blackstone Avenue, and Cambridge Avenue.
       ii. Create TAZ 966B bounded by Cambridge Avenue, Fresno Street, University Avenue, and Blackstone Avenue. TAZ 966B shall have TAZ connectors to Cambridge Avenue, Fresno Avenue, and University Avenue.
       iii. Create TAZ 966C bounded by University Avenue, Fresno Avenue, McKinley Avenue, and Blackstone Avenue. TAZ 966C shall have TAZ connectors to University Avenue, Fresno Avenue, McKinley Avenue, and Blackstone Avenue.
14. Modify Fresno Avenue to increase lanes between McKinley Avenue and Divisadero Street to two lanes in each direction.

LINK and TAZ MODIFICATIONS (For Cumulative Year 2035 plus Project Select Zone Scenario Only):

1. Create future TAZ A generally located south of Weldon Avenue and west of Blackstone Avenue (see Exhibit B). Future TAZ A shall have one TAZ connector to Weldon Avenue. (Note: Future TAZ A is being added to the 2035 network and thus its trip generation is presented in positive numbers.)
2. Create future TAZ B generally located west of Blackstone Avenue between Weldon Avenue and University Avenue (see Exhibit B). Future TAZ B shall have one TAZ connector to Weldon Avenue and another to University Avenue. (Note: Future TAZ B is being added to the 2035 network and thus its trip generation is presented in positive numbers.)
3. Create future TAZ C generally located west of Blackstone Avenue and between Cambridge Avenue and Weldon Avenue (see Exhibit B). Future TAZ C shall have one TAZ connector to Cambridge Avenue and another to Weldon Avenue. (Note: Future TAZ C is being added to the 2035 network and thus its trip generation is presented in positive numbers.)
4. Create future TAZ D generally located west of San Pablo Avenue and south of Clinton Avenue (see Exhibit B). Future TAZ D shall have one TAZ connector to San Pablo Avenue. (Note: Future TAZ D is being added to the 2035 network and thus its trip generation is presented in positive numbers.)

TAZ A Trip Generation (For Base Year 2019 and Cumulative Year 2035 plus Project Select Zone Scenarios)

Table I presents the trip generation for 2019 TAZ A pursuant to the 10th Edition of the Trip Generation Manual with trip generation rates for Junior/Community College. At present, TAZ A is estimated to generate a maximum of 1,127 daily trips, 108 AM peak hour trips and 108 PM peak hour trips.

Table I: 2019 TAZ A Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM Peak Hour*						*PM Peak Hour*					
			Rate	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*
Junior/Community College (540)	980	students	1.15	-1,127	0.11	81	19	-87	-21	-108	0.11	56	44	-60	-48	-108
2019 TAZ A Trips				**-1,127**				**-87**	**-21**	**-108**				**-60**	**-48**	**-108**

Table II presents the trip generation for 2035 TAZ A pursuant to the 10th Edition of the Trip Generation Manual with trip generation rates for Junior/Community College. At buildout, TAZ A is estimated to generate a maximum of 1,127 daily trips, 108 AM peak hour trips and 108 PM peak hour trips.

Table II: 2035 TAZ A Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM Peak Hour*						*PM Peak Hour*					
			Rate	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*
Junior/Community College (540)	1,110	students	1.15	1,277	0.11	81	19	99	23	122	0.11	56	44	68	54	122
2035 TAZ A Trips				**1,277**				**99**	**23**	**122**				**68**	**54**	**122**

TAZ B Trip Generation (For Base Year 2019 and Cumulative Year 2035 plus Project Select Zone Scenarios)

Table III presents the trip generation for 2019 TAZ B pursuant to the 10th Edition of the Trip Generation Manual with trip generation rates for Day Care Center. At present, TAZ B is estimated to generate a maximum of 315 daily trips, 60 AM peak hour trips and 61 PM peak hour trips.

Table III: 2019 TAZ B Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM Peak Hour*						*PM Peak Hour*					
			Rate	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*
Day Care Center (565)	77	students	4.09	-315	0.78	53	47	-32	-28	-60	0.79	47	53	-29	-32	-61
2019 TAZ B Trips				**-315**				**-32**	**-28**	**-60**				**-29**	**-32**	**-61**

Table VI presents the trip generation for 2035 TAZ B pursuant to the 10th Edition of the Trip Generation Manual with trip generation rates for Day Care Center. At buildout, TAZ B is estimated to generate a maximum of 487 daily trips, 93 AM peak hour trips and 94 PM peak hour trips.

Table IV: 2035 TAZ B Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM Peak Hour*						*PM Peak Hour*					
			Rate	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*
Day Care Center (565)	119	students	4.09	487	0.78	53	47	49	44	93	0.79	47	53	44	50	94
2035 TAZ B Trips				**487**				**49**	**44**	**93**				**44**	**50**	**94**

TAZ C Trip Generation (For Base Year 2019 and Cumulative Year 2035 plus Project Select Zone Scenarios)

Table V presents the trip generation for 2019 TAZ C1 pursuant to the 10th Edition of the Trip Generation Manual with trip generation rates for Government Office Building. At present, TAZ C1 is estimated to generate a maximum of 171 daily trips, 25 AM peak hour trips and 16 PM peak hour trips.

Table V: 2019 TAZ C1 Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM Peak Hour*						*PM Peak Hour*					
			Rate	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*	*Trip Rate*	*In* %	*Out* %	*In*	*Out*	*Total*
Government Office Building (730)	23	employees	7.45	-171	1.10	75	25	-19	-6	-25	0.71	20	80	-3	-13	-16
2019 TAZ C1 Trips				**-171**				**-19**	**-6**	**-25**				**-3**	**-13**	**-16**

Table VI presents the trip generation for 2019 TAZ C2 pursuant to the 10th Edition of the Trip Generation Manual with trip generation rates for School District Office. At present, TAZ C2 is estimated to generate a maximum of 356 daily trips, 58 AM peak hour trips and 50 PM peak hour trips.

Table VI: 2019 TAZ C2 Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM Peak Hour						PM Peak Hour					
			Rate	Total	Trip Rate	In %	Out %	In	Out	Total	Trip Rate	In %	Out %	In	Out	Total
School District Office (538)	70	employees	5.08	-356	0.83	76	24	-44	-14	-58	0.72	17	83	-9	-41	-50
2019 TAZ C2 Trips				**-356**				**-44**	**-14**	**-58**				**-9**	**-41**	**-50**

Table VII presents the trip generation for 2035 TAZ C pursuant to the 10th Edition of the Trip Generation Manual with trip generation rates for School District Office and Government Office Building. At buildout, TAZ C is estimated to generate a maximum of 410 daily trips, 64 AM peak hour trips and 50 PM peak hour trips.

Table VII: 2035 TAZ C Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM Peak Hour						PM Peak Hour					
			Rate	Total	Trip Rate	In %	Out %	In	Out	Total	Trip Rate	In %	Out %	In	Out	Total
School District Office (538)	47	employees	5.08	239	0.83	76	24	30	9	39	0.72	17	83	6	28	34
Government Office Building (730)	23	employees	7.45	171	1.10	75	25	19	6	25	0.71	20	80	3	13	16
2035 TAZ B Trips				**410**				**49**	**15**	**64**				**9**	**41**	**50**

TAZ D Trip Generation (For Base Year 2019 and Cumulative Year 2035 plus Project Select Zone Scenarios)

Table VIII presents the trip generation for 2019 TAZ D with trip generation rates for Maintenance and Operations. The trip generation rates for the Maintenance and Operations building were prepared based on operational data provided by SCCCD. At present, TAZ D is estimated to generate a maximum of 76 daily trips, 11 AM peak hour trips and 2 PM peak hour trips.

Table VIII: 2019 TAZ D Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM Peak Hour						PM Peak Hour					
			Rate	Total	Trip Rate	In %	Out %	In	Out	Total	Trip Rate	In %	Out %	In	Out	Total
Maintenance and Operations	30	employees	2.52	-76	0.38	50	50	-6	-5	-11	0.08	50	50	-1	-1	-2
2019 TAZ D Trips				**-76**				**-6**	**-5**	**-11**				**-1**	**-1**	**-2**

Table IX presents the trip generation for 2035 TAZ D with trip generation rates for Maintenance and Operations. The trip generation rates for the Maintenance and Operations building were prepared based on operational data provided by SCCCD. At buildout, TAZ D is estimated to generate a maximum of 56 daily trips, 8 AM peak hour trips and 2 PM peak hour trips.

Table IX: 2035 TAZ D Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM Peak Hour						PM Peak Hour					
			Rate	Total	Trip Rate	In %	Out %	In	Out	Total	Trip Rate	In %	Out %	In	Out	Total
Maintenance and Operations	22	employees	2.52	56	0.38	50	50	4	4	8	0.08	50	50	1	1	2
2035 TAZ D Trips				**56**				**4**	**4**	**8**				**1**	**1**	**2**

Please invoice JLB Traffic Engineering, Inc. and reference JLB Project No. 004-085 on the invoice. If you have any questions or require additional information, please do not hesitate to contact me by phone at (559) 317-6273 or by e-mail at smaciel@JLBtraffic.com.

Sincerely,

Susana Maciel

Susana Maciel, EIT
Engineer I/II

cc: Lang Yu, Fresno COG
Jose Benavides, JLB Traffic Engineering, Inc.

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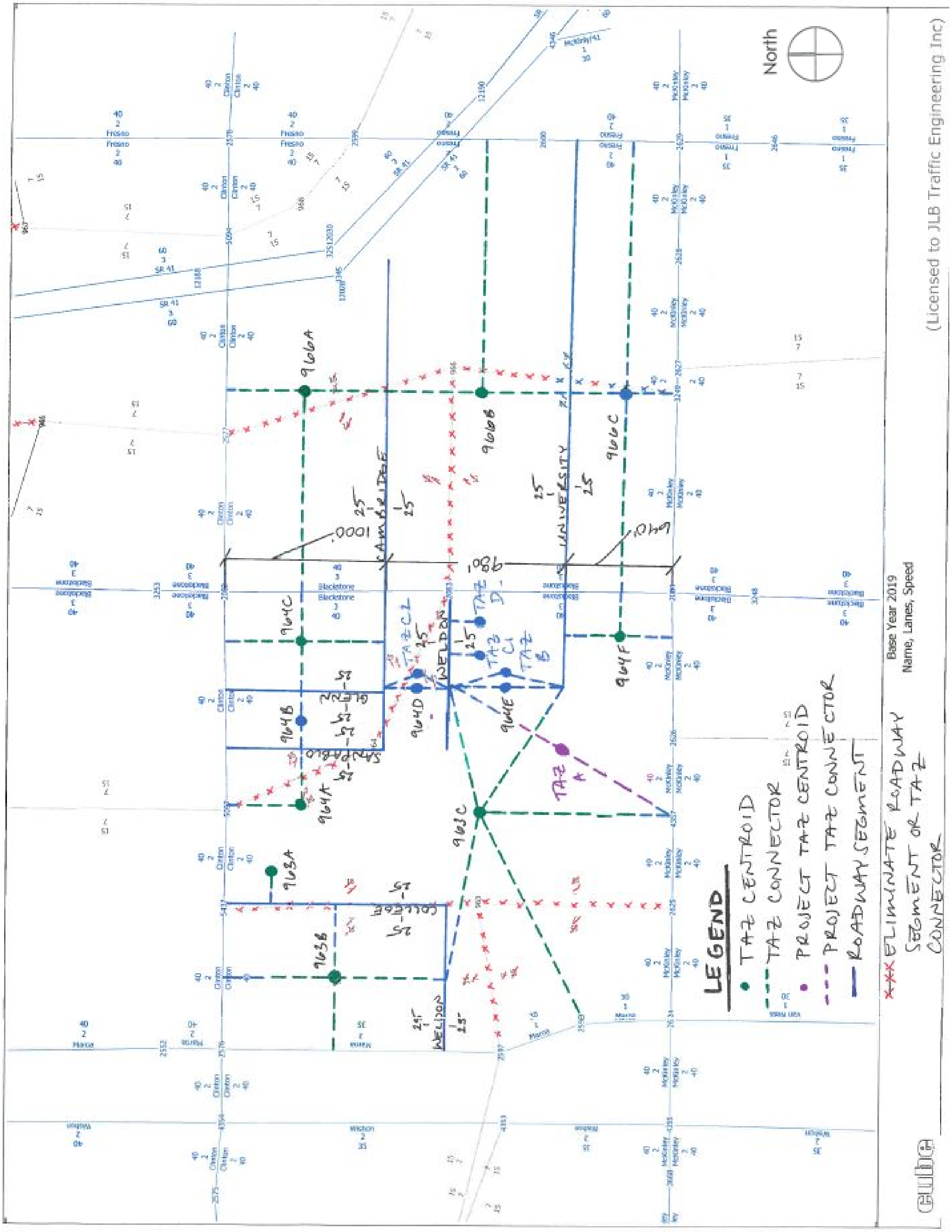
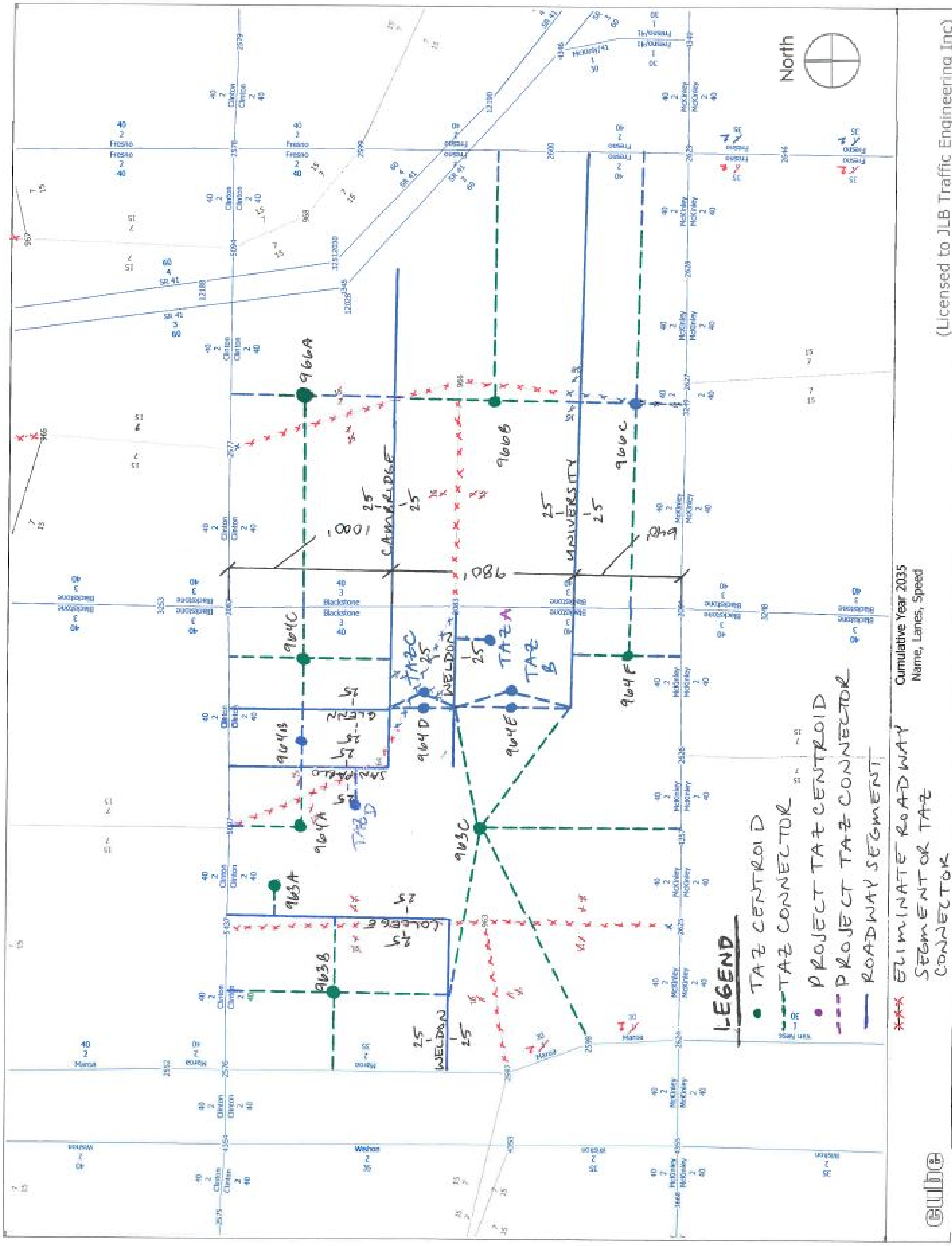
Exhibit A – Aerial

Exhibit B – Model TAZ Modifications




North
(Licensed to JLB Traffic Engineering Inc)
Cumulative Year 2035
Name, Lanes, Speed
LEGEND
TAZ CENTROID
TAZ CONNECTOR
PROJECT TAZ CENTROID
PROJECT TAZ CONNECTOR
ROADWAY SEGMENT
ELIMINATE ROADWAY SEGMENT OR TAZ CONNECTOR
CAMBRIDGE
UNIVERSITY
WELDON
GLENN
COLLEGE
Blackstone
Clinton
McKinley
Fresno
Weldon
Marcia
966A
966B
966C
964C
964B
964D
964E
964F
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963C
963A
963B
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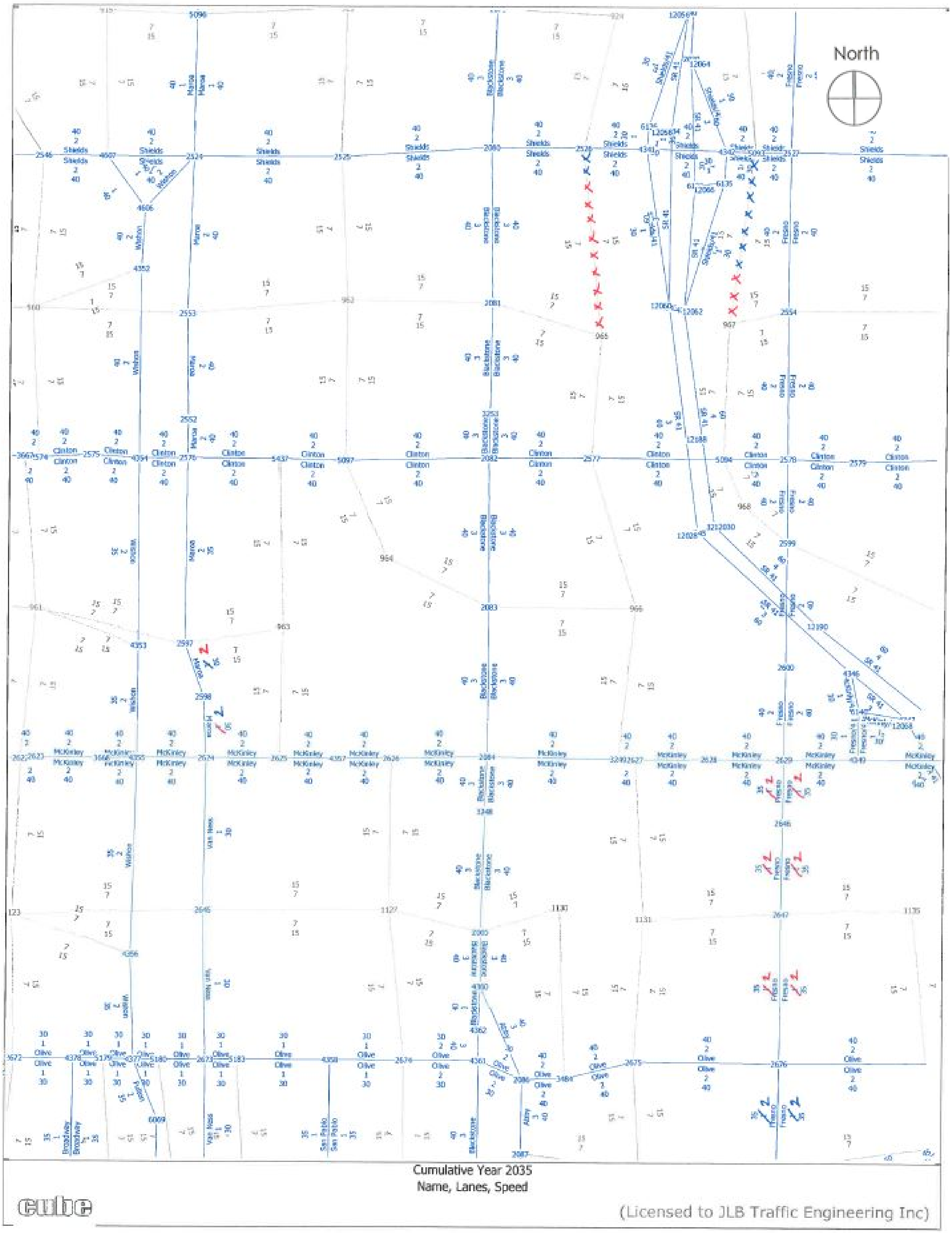
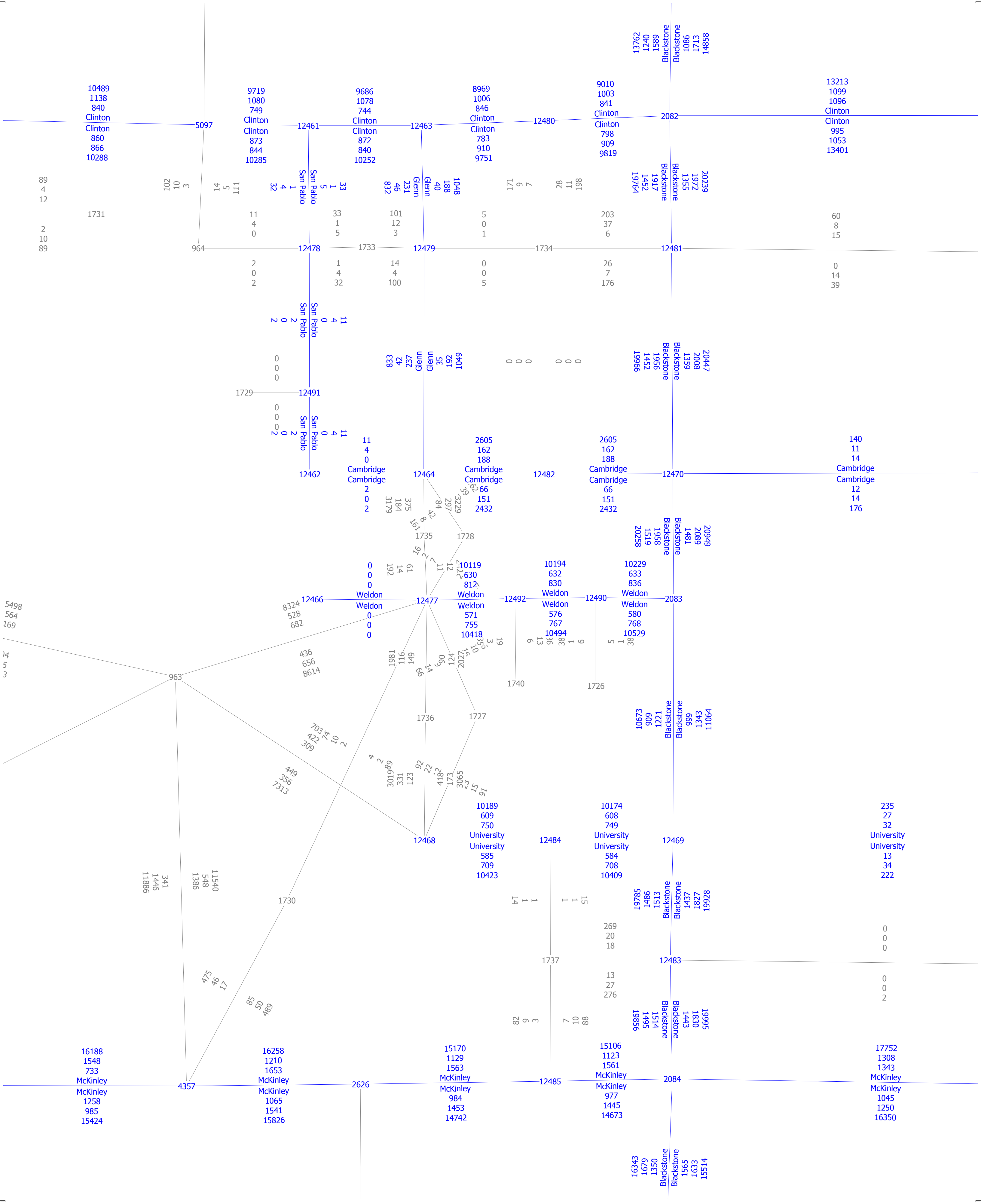
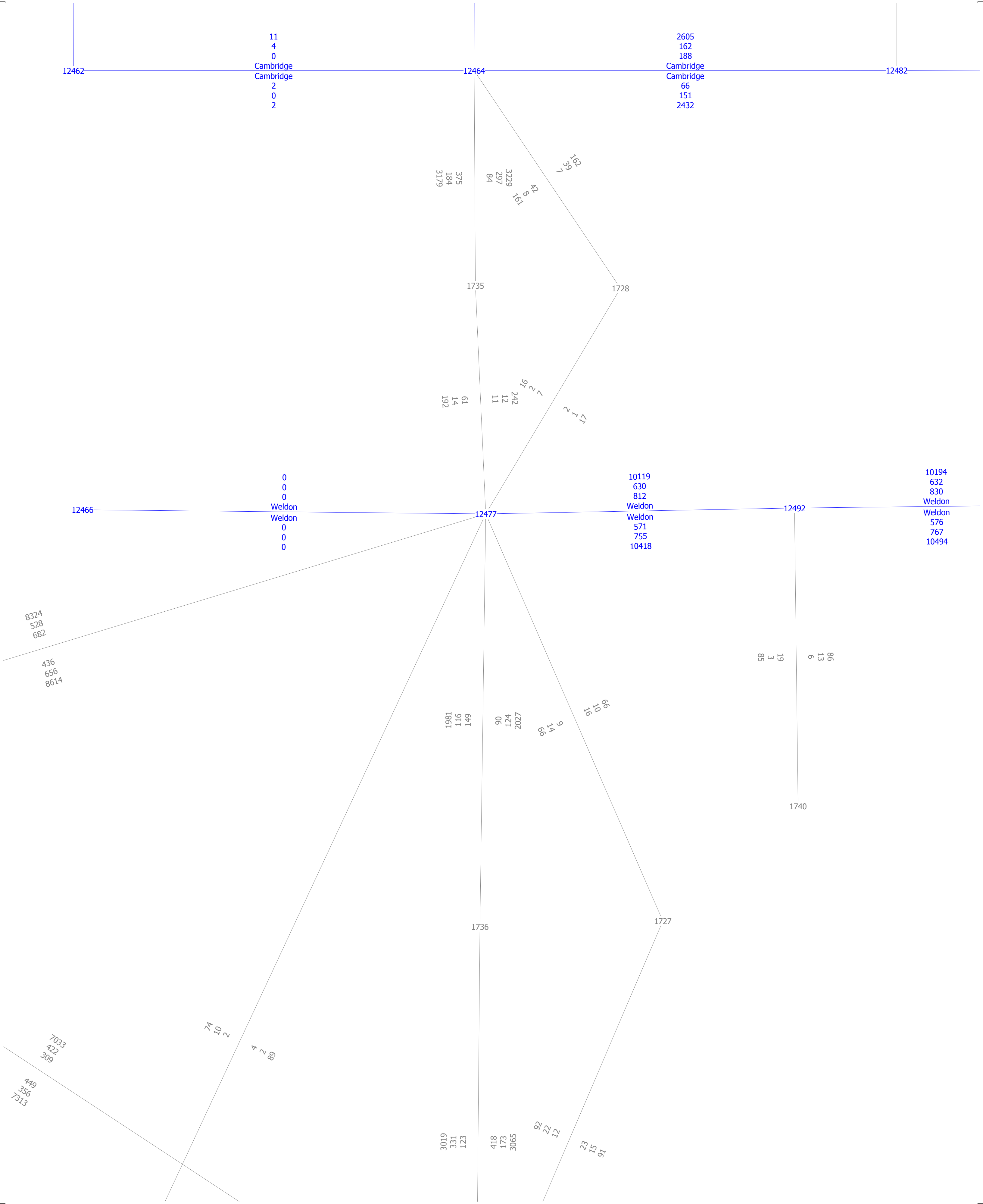
TAZ B
TAZ C
TAZ D

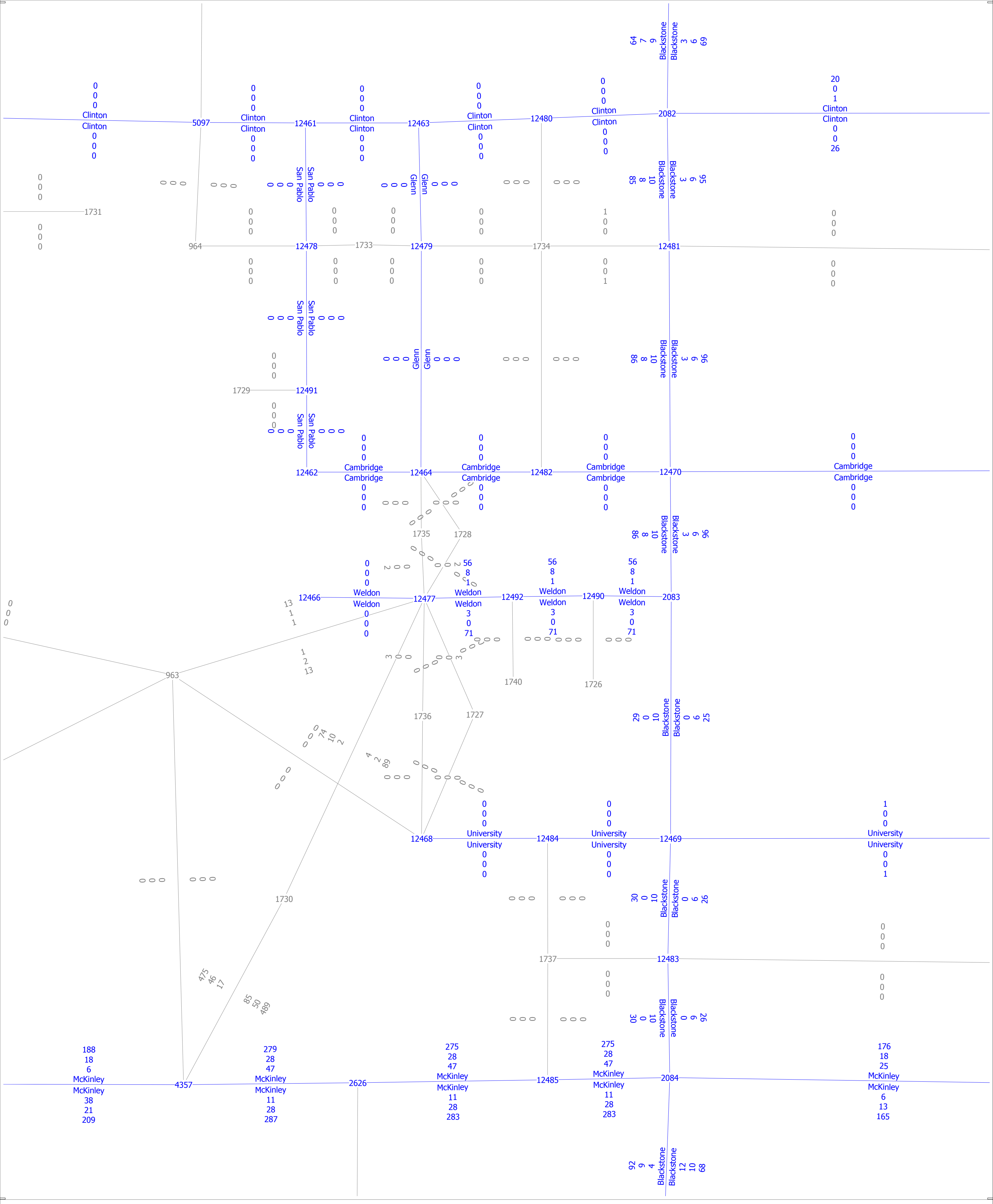

North
Shields
Clinton
McKinley
Olive
Blackstone
Fresno
Maroa
Wishon
SR 41
Van Ness
Cumulative Year 2035
Name, Lanes, Speed
cube
(Licensed to JLB Traffic Engineering Inc)



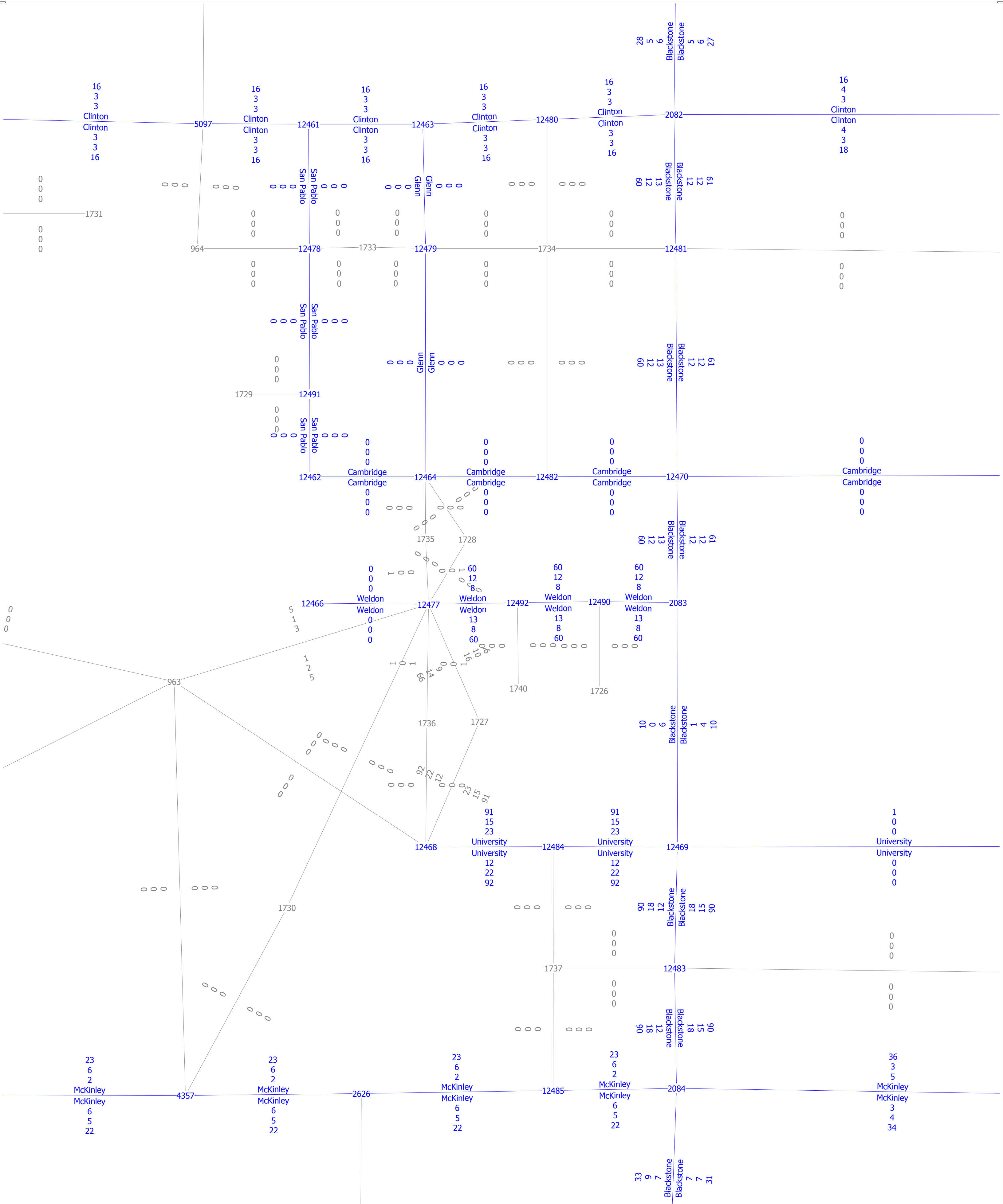
Base Year 2019
AM, PM and Daily Volumes



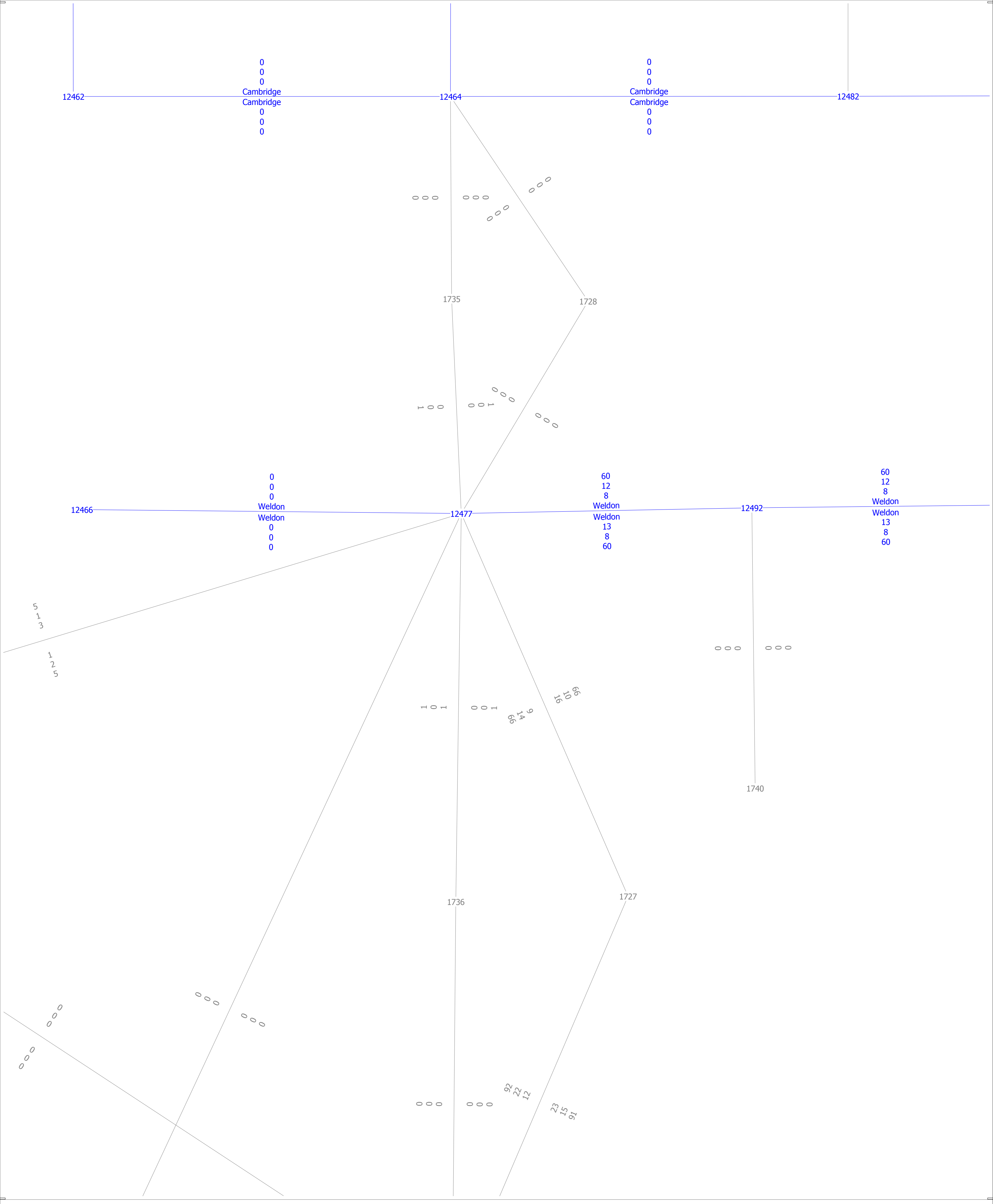
Base Year 2019
AM, PM and Daily Volumes



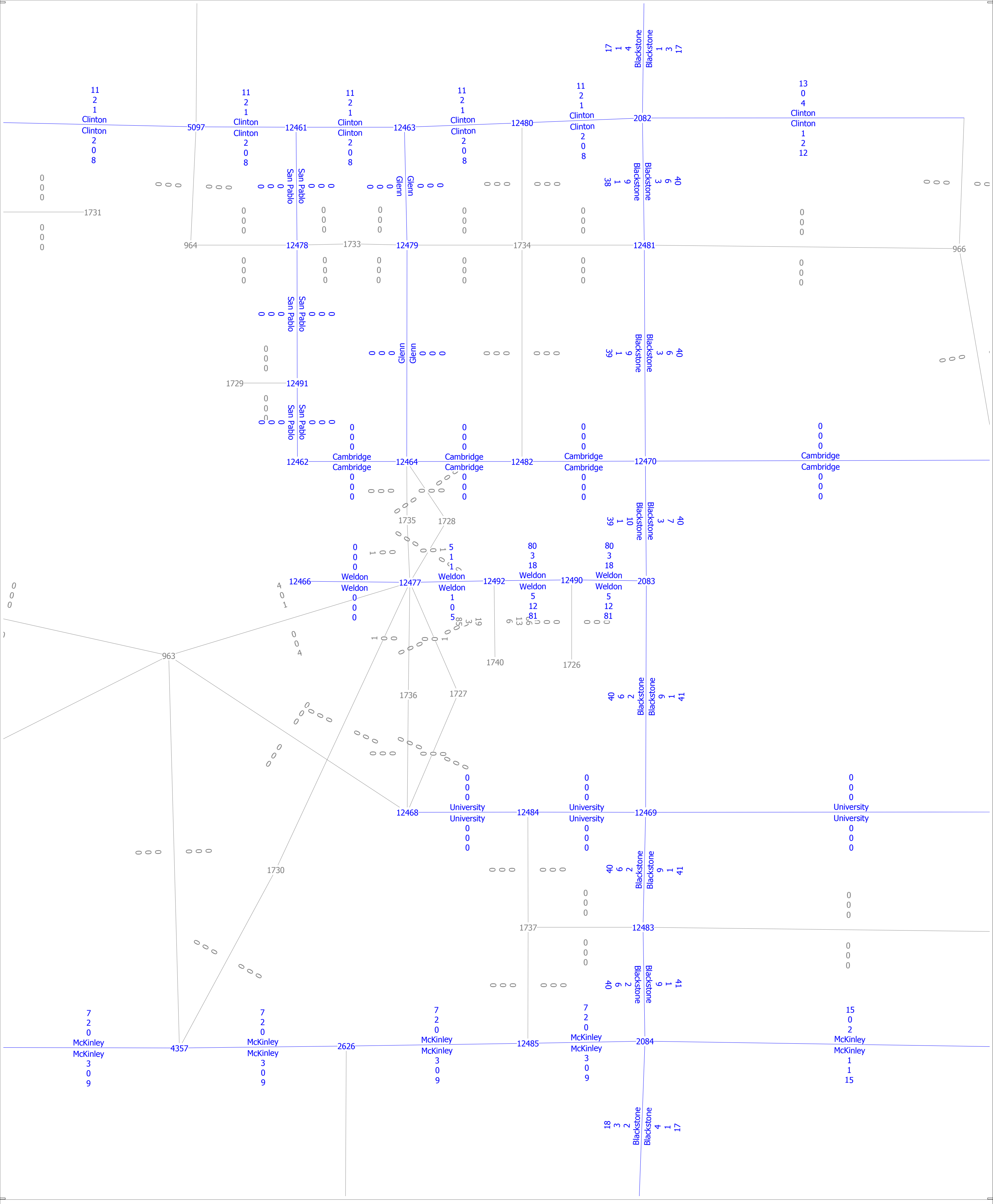
Base Year 2019
Science Building
AM, PM and Daily Volumes



Base Year 2019
Child Development Center
AM, PM and Daily Volumes



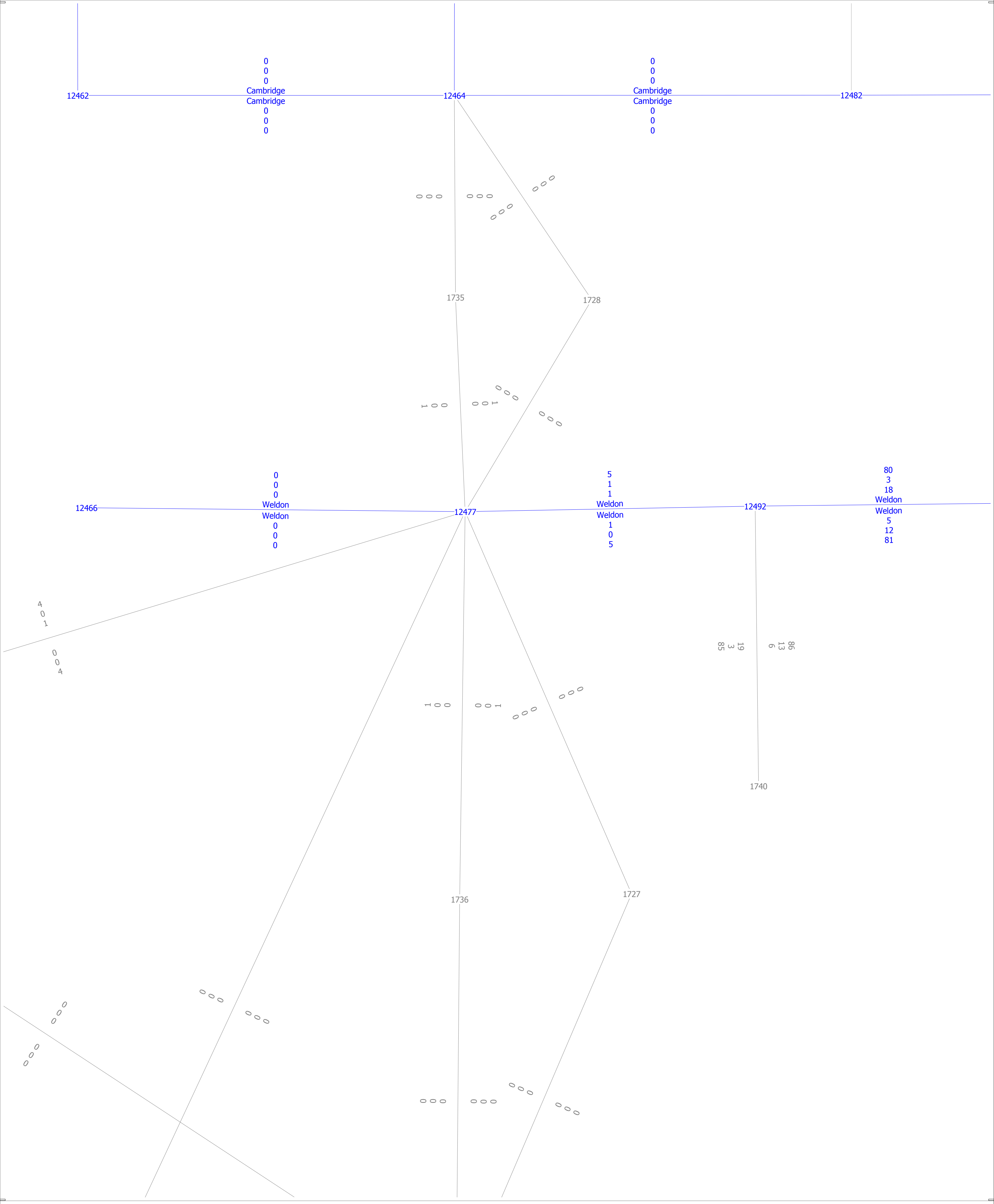
Base Year 2019
Child Development Center
AM, PM and Daily Volumes



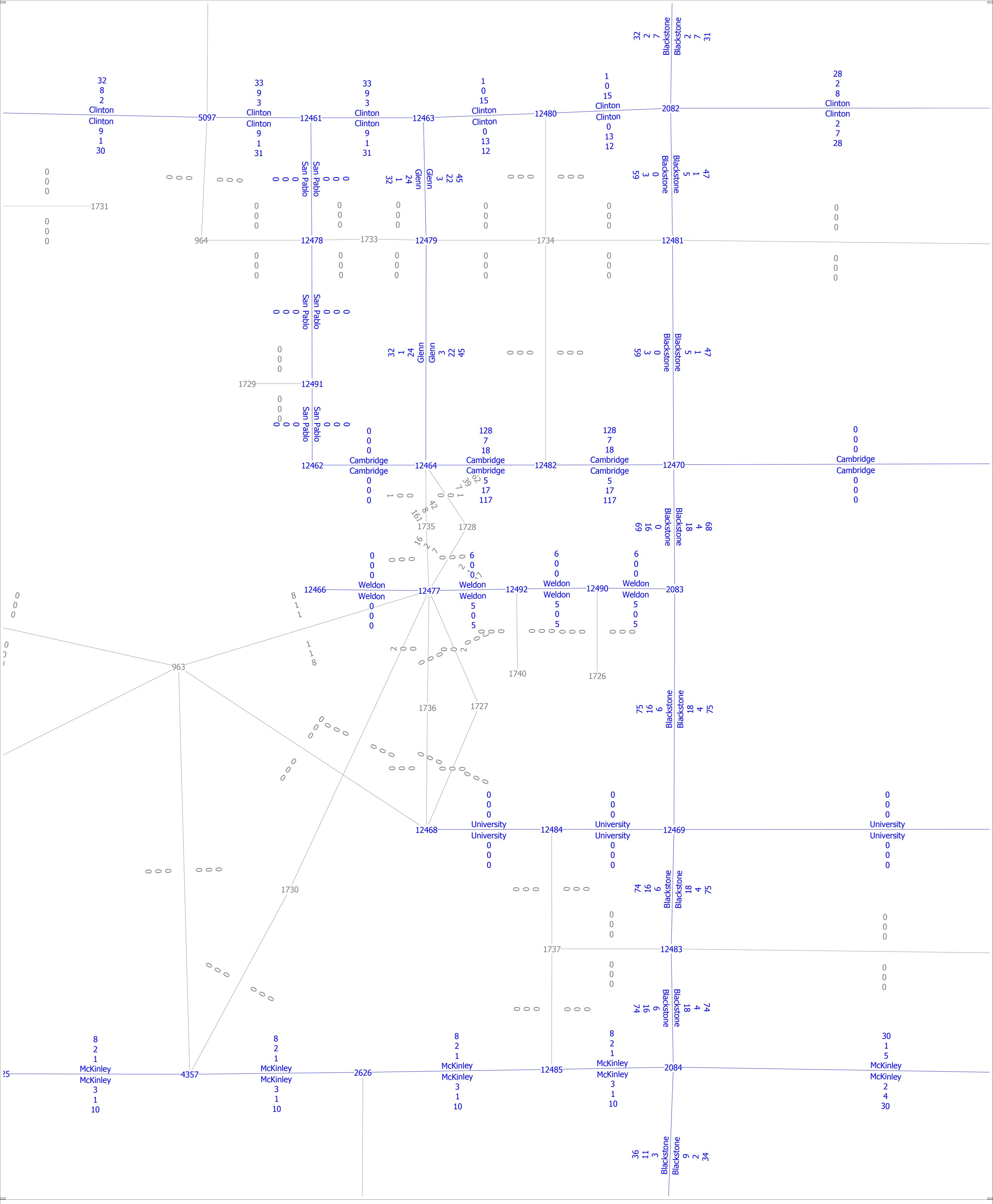
Base Year 2019

Police Department

AM, PM and Daily Volumes

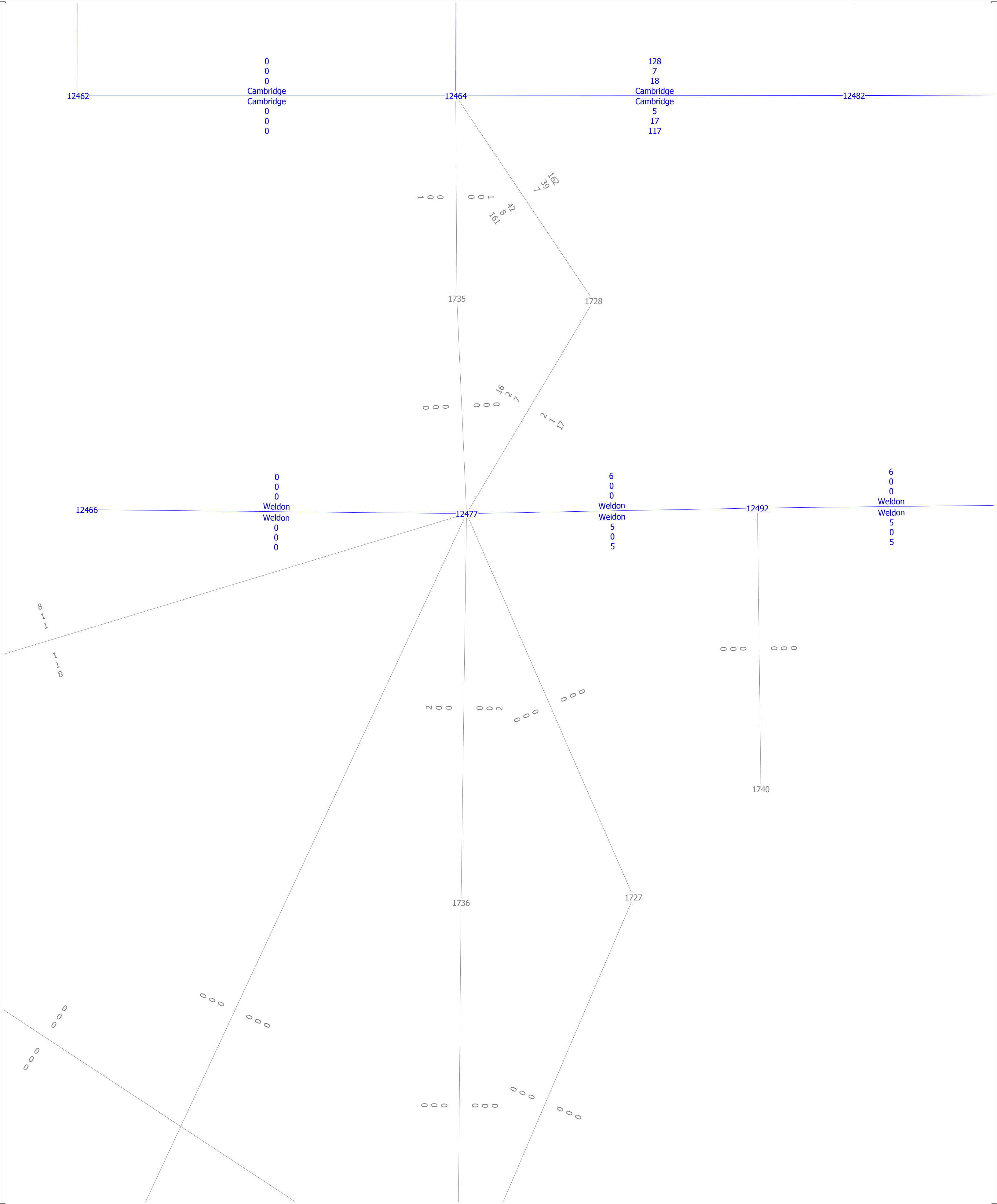


Base Year 2019
Police Department
AM, PM and Daily Volumes

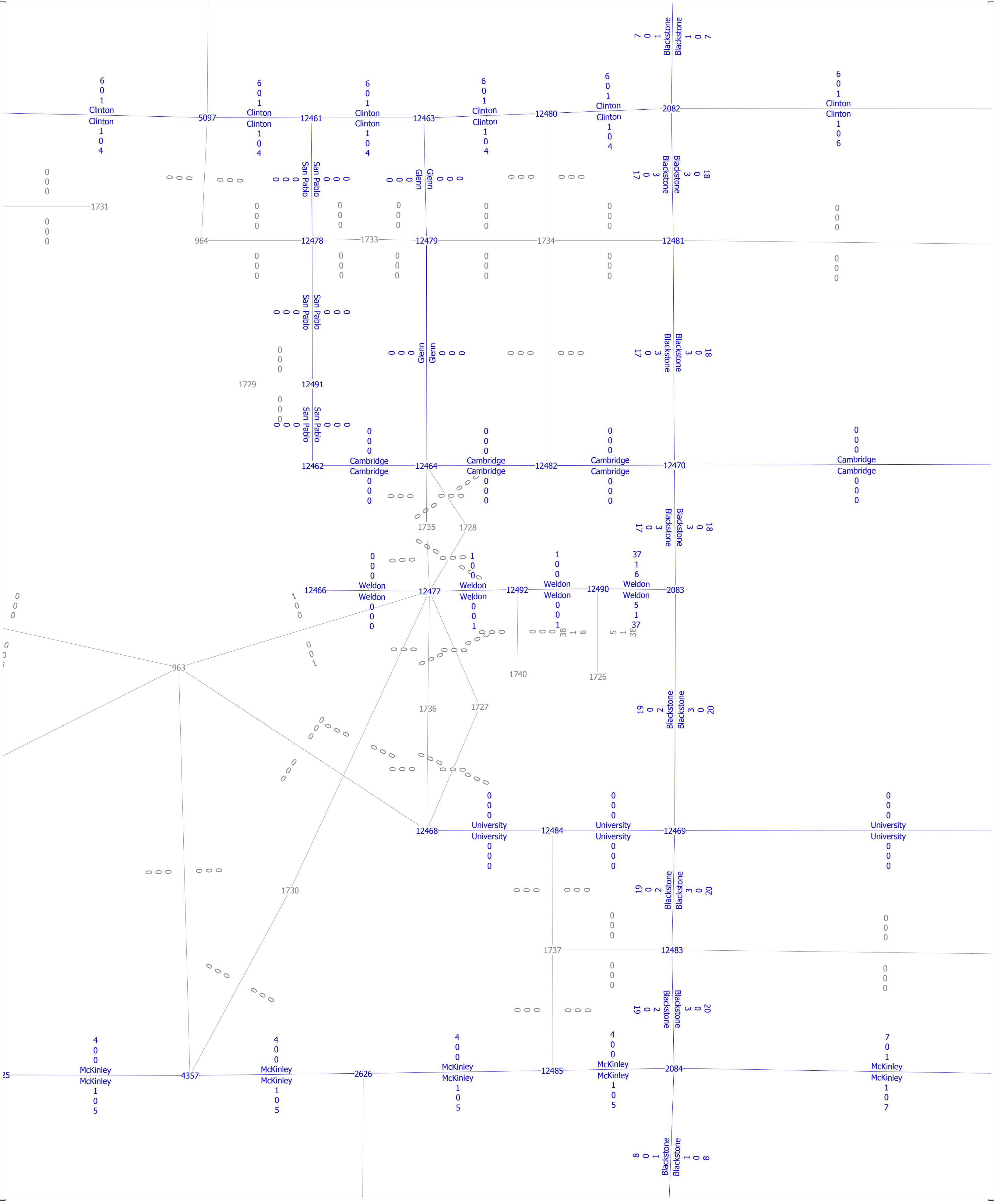


Base Year 2019
Administration
AM, PM and Daily Volumes

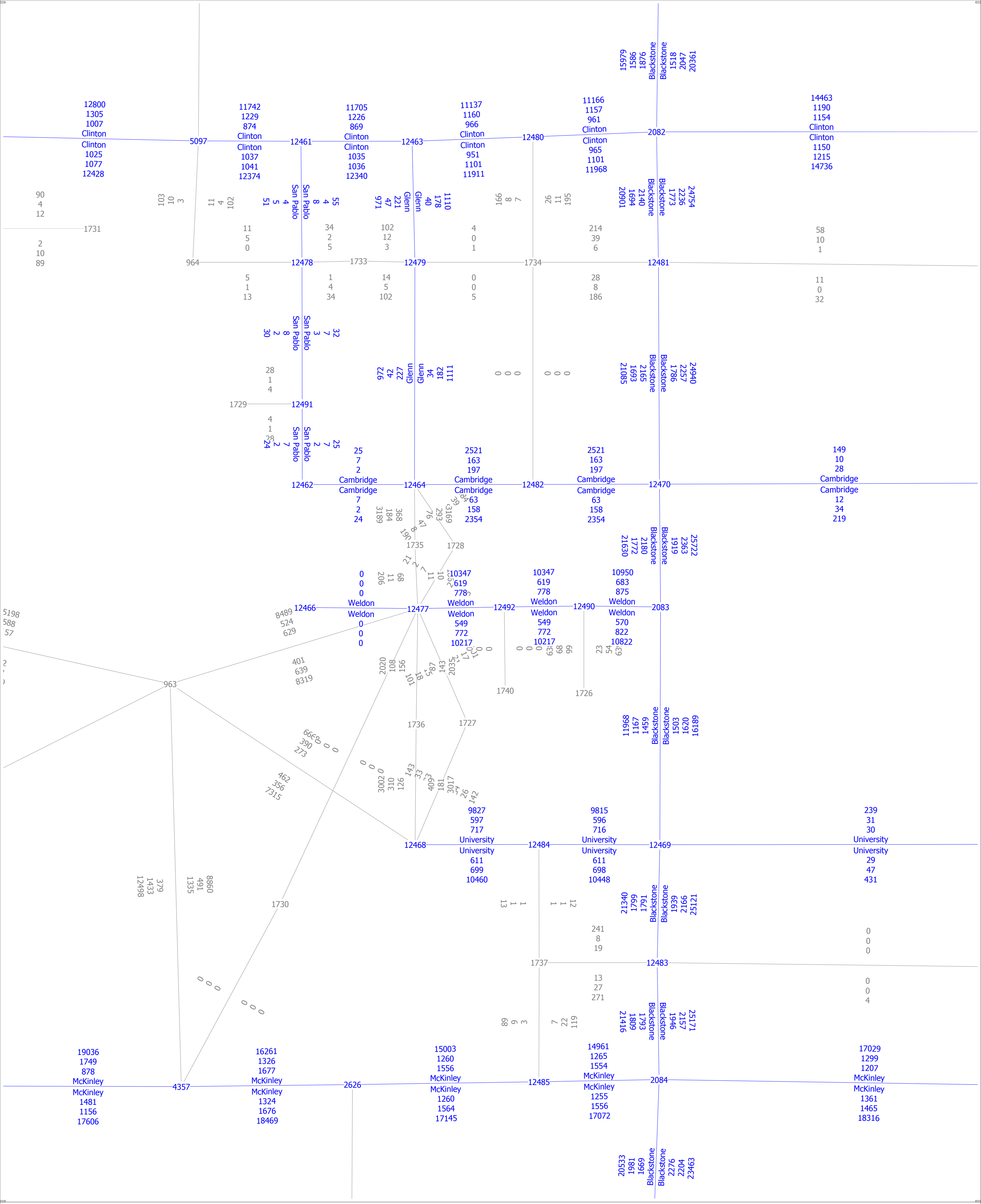
cube



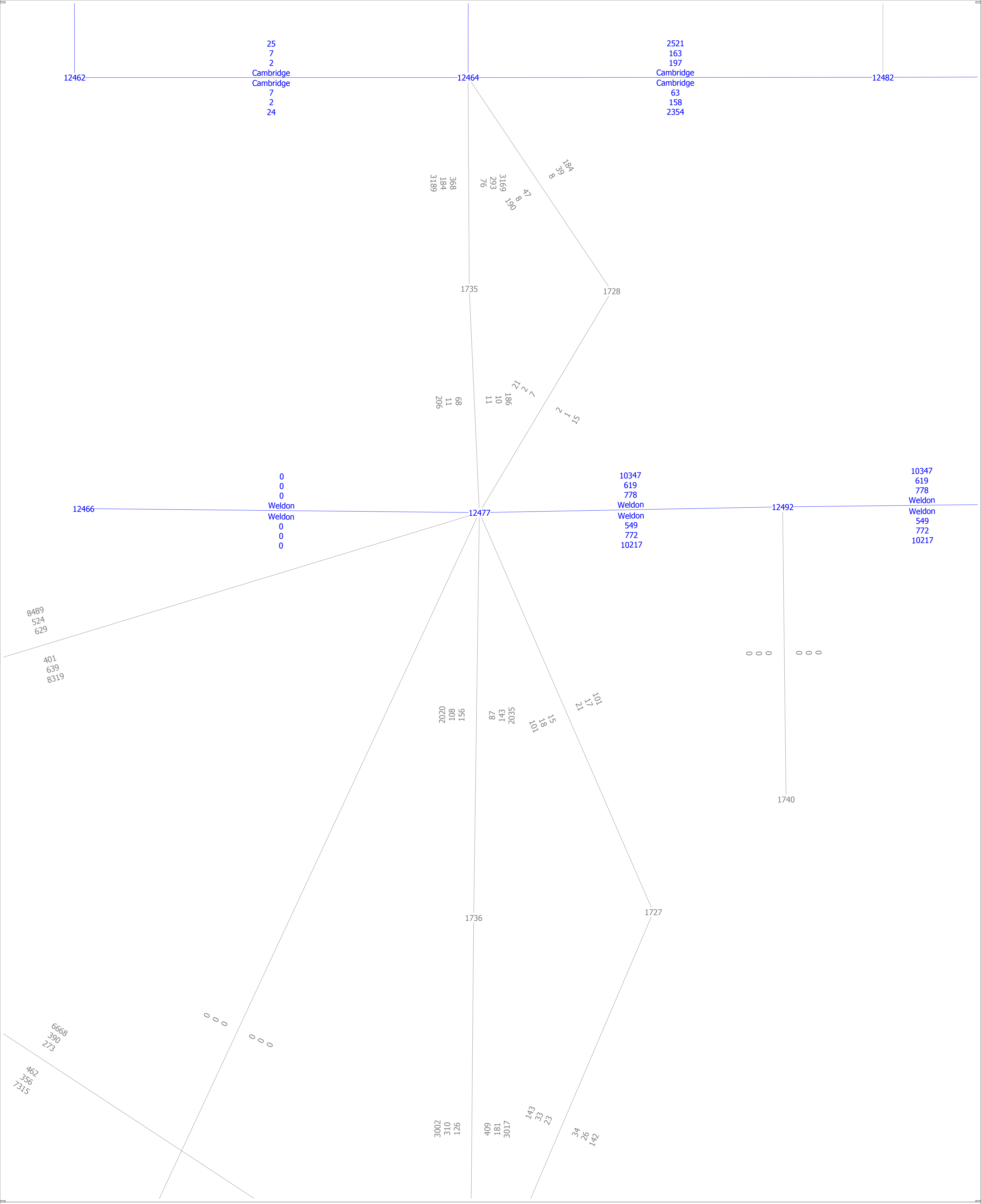
Base Year 2019
Administration
AM, PM and Daily Volumes



Base Year 2019
Maintenance and Operations
AM, PM and Daily Volumes



Cumulative Year 2035
AM, PM and Daily Volumes



Cumulative Year 2035
AM, PM and Daily Volumes

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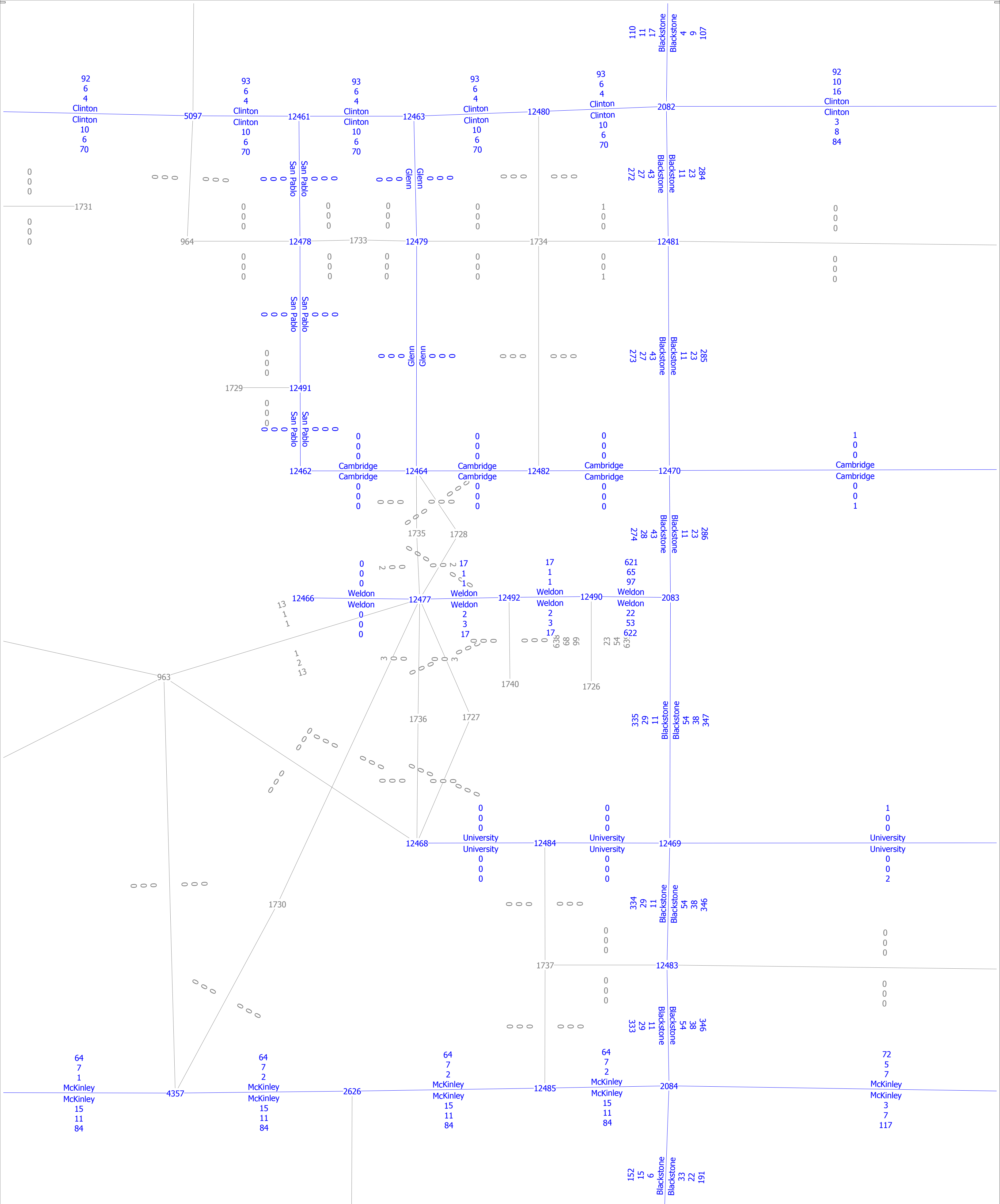
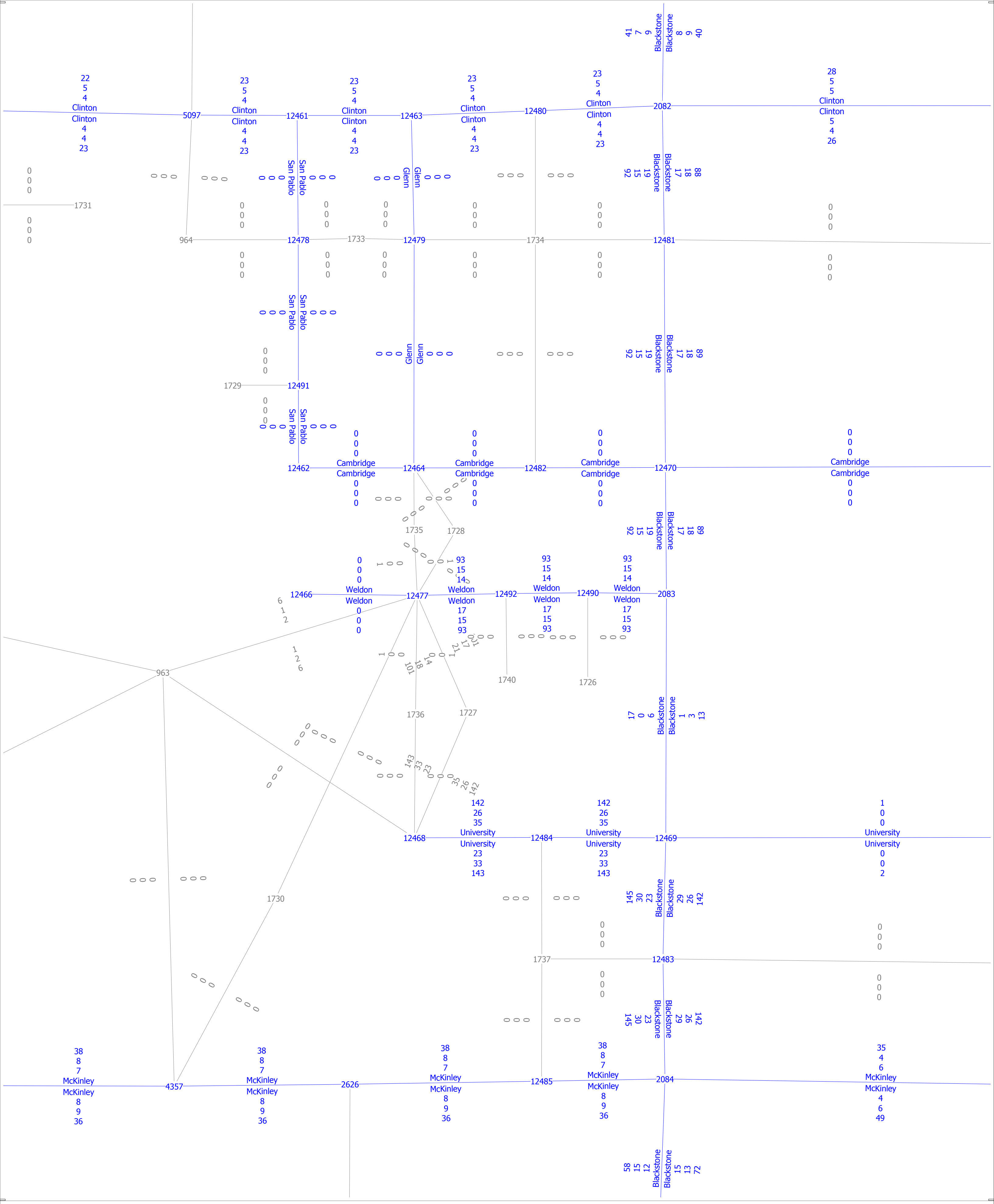


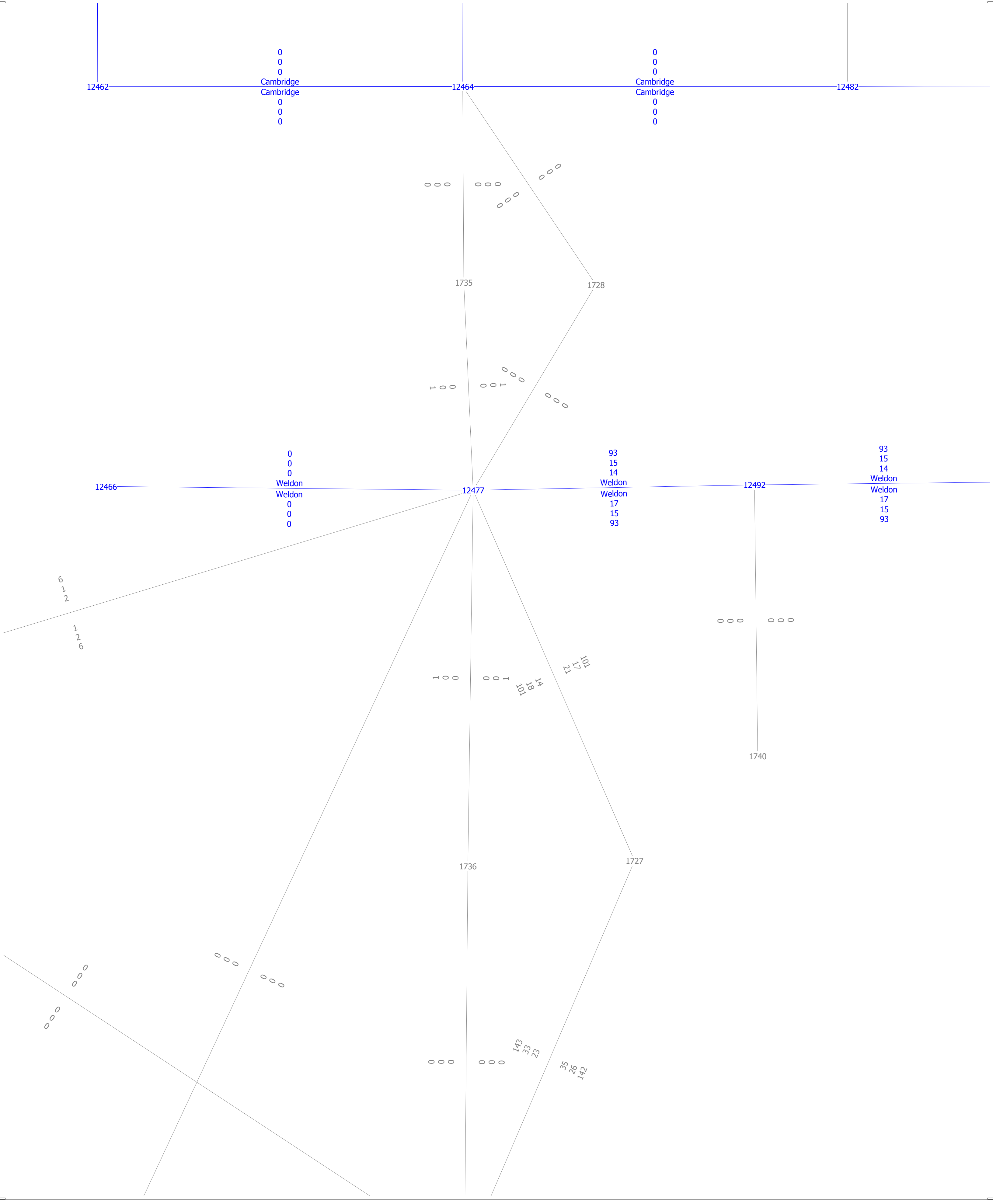
Cumulative Year 2035
Science Building
AM, PM and Daily Volumes

cube



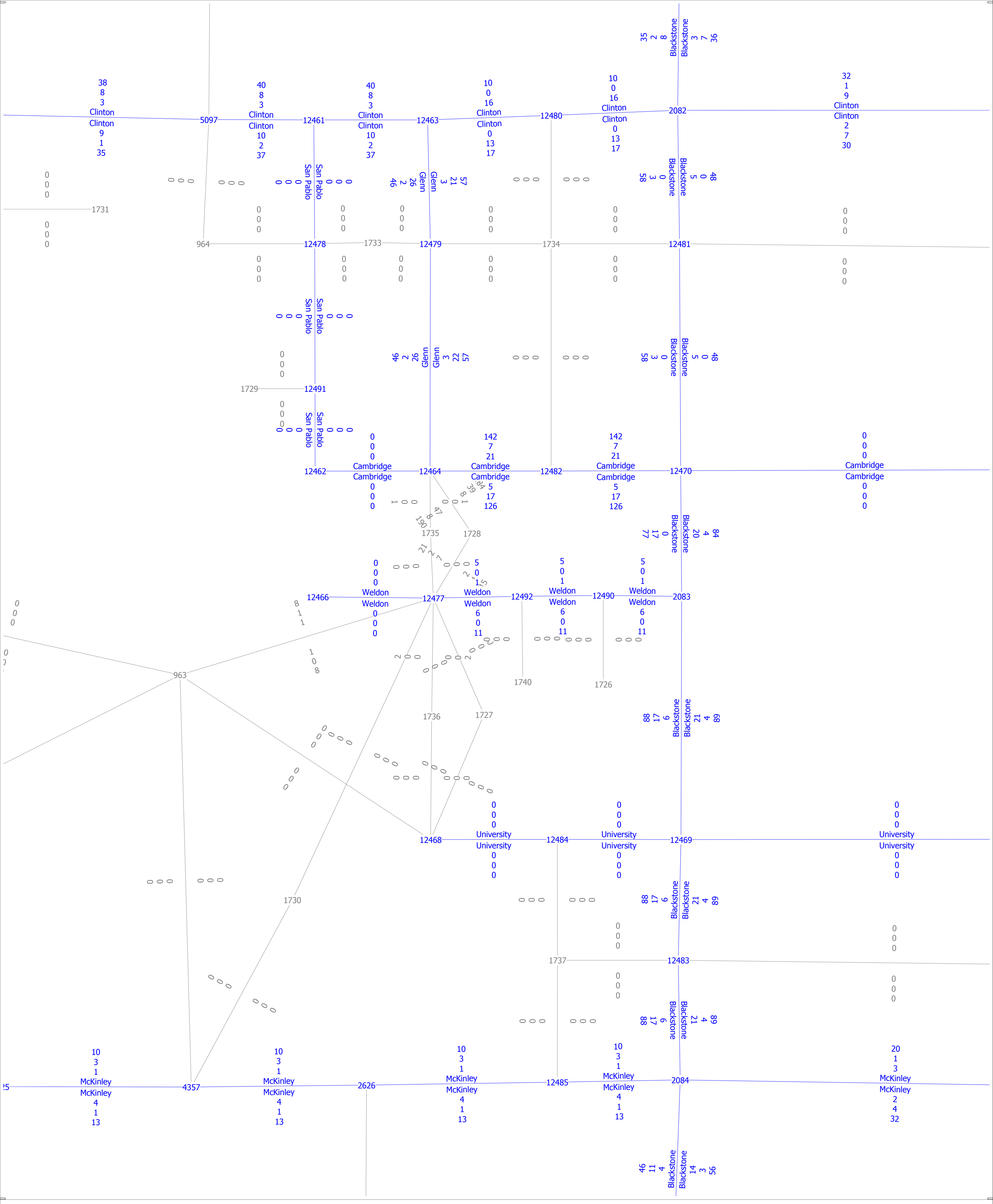
Cumulative Year 2035
Child Development Center
AM, PM and Daily Volumes

cube

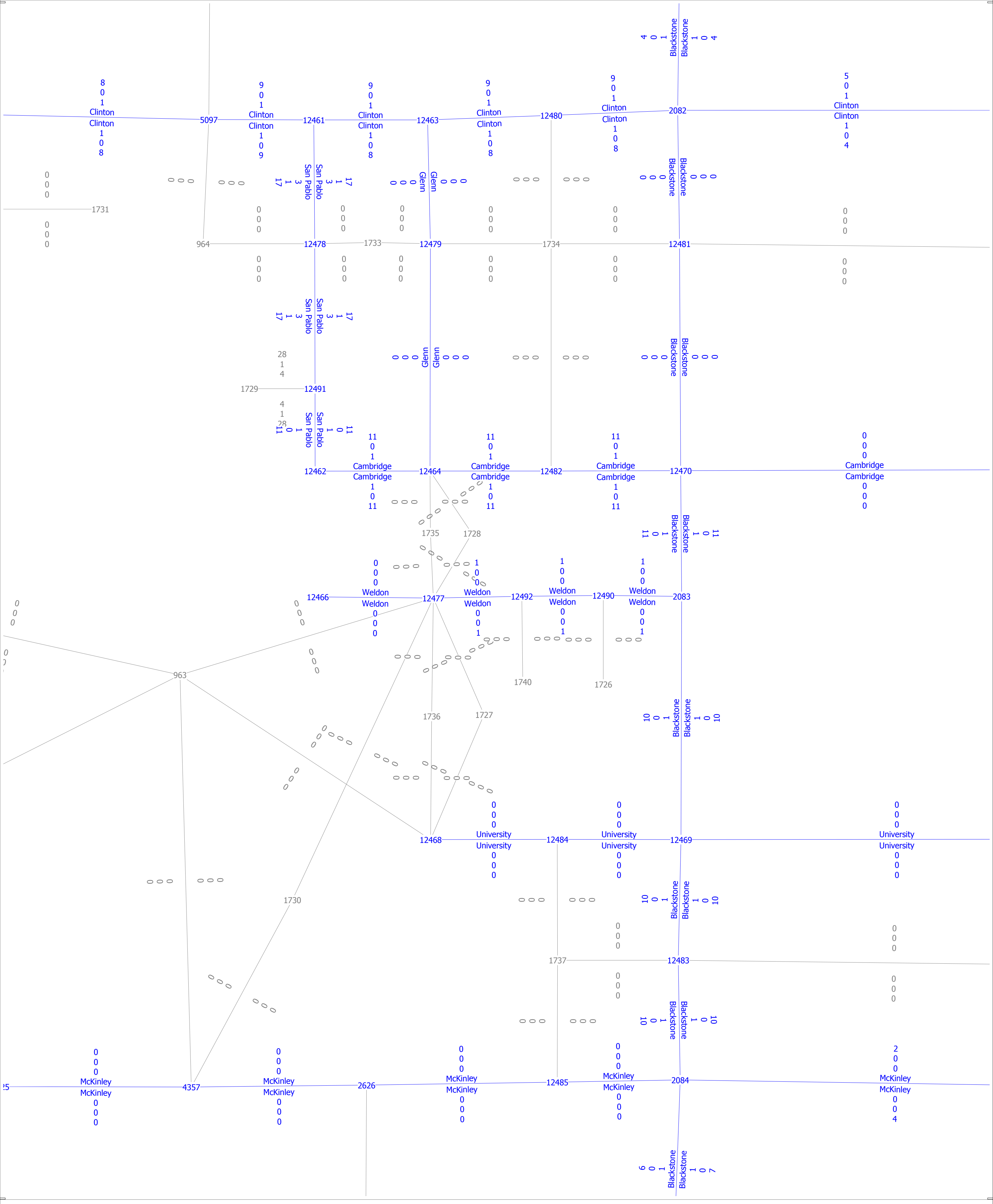


Cumulative Year 2035
Child Development Center
AM, PM and Daily Volumes

cube



Cumulative Year 2035
Administration and Police Department
AM, PM and Daily Volumes



Cumulative Year 2035
Maintenance and Operations
AM, PM and Daily Volumes

(Licensed to JLB Traffic Engineering Inc)

Appendix D: Methodology

Levels of Service Methodology

The description and procedures for calculating capacity and level of service (LOS) are found in the Transportation Research Board, Highway Capacity Manual (HCM). The HCM 2010 represents the research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level of service (LOS), from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish a LOS.

Urban Streets (Automobile Mode)

The term "urban streets" refers to urban arterials and collectors, including those in downtown areas. Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials. Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals. Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing taxicabs, buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

Flow Characteristics

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control.

The street environment includes the geometric characteristics of the facility, the character of roadside activity, and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway/access point density, spacing between signalized intersections, existence of parking, level of pedestrian and bicyclist activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic controls (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds; however, such controls are needed to establish right-of-way.

Levels of Service (automobile Mode)

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service (LOS). The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

LOS A describes primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal. Travel speeds exceed 85 of the base free flow speed (FFS).

LOS B describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67 and 85 percent of the base FFS.

LOS C describes stable operations. The ability to maneuver and change lanes in midblock location may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50 and 67 percent of the base FFS.

LOS D indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volumes, inappropriate signal timing, at the boundary intersections. The travel speed is between 40 and 50 percent of the base FFS.

LOS E is characterized unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30 and 40 percent of the base FFS.

LOS F is characterized by street flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30 percent or less of the base FFS.

Table A-1: Urban Street Levels of Service (Automobile Mode)

Travel Speed as a Percentage of Base Free-Flow Speed (%)	LOS by Critical Volume-to-Capacity Ratio[a]	
	≤1.0	>1.0
>85	A	F
>67 to 85	B	F
>50 to 67	C	F
>40 to 50	D	F
>30 to 40	E	F
≤30	F	F

a = The Critical volume-to-capacity ratio is based on consideration of the through movement-to-capacity ratio at each boundary intersection in the subject direction of travel. The critical volume-to-capacity ratio is the largest ratio of those considered.
Source: Highway Capacity Manual 2010, Exhibit 16-4. Urban Street LOS Criteria (Automobile Mode)

Intersection Levels of Service

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs.

Signalized Intersections – Performance Measures

For signalized intersections the performance measures include automobile volume-to-capacity ratio, automobile delay, queue storage length, ratio of pedestrian delay, pedestrian circulation area, pedestrian perception score, bicycle delay, and bicycle perception score. LOS is also considered a performance measure. For the automobile mode average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A LOS designation is given to the weighted average control delay to better describe the level of operation. A description of LOS for signalized intersections is found in Table A-2.

Table A-2: Signalized Intersection Level of Service Description (Automobile Mode)

Level of Service	Description	Average Control Delay (seconds per vehicle)
A	Operations with a control delay of 10 seconds/vehicle or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when volume-to-capacity ratio is and either progression is exceptionally favorable or the cycle length is very short. If it's due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.	≤10
B	Operations with control delay between 10.1 to 20.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.	>10.0 to 20.0
C	Operations with average control delays between 20.1 to 35.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.	>20 to 35
D	Operations with control delay between 35.1 to 55.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop, and i ndividual cycle failures are noticeable.	>35 to 55
E	Operations with control delay between 55.1 to 80.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.	>55 to 80
F	Operations with unacceptable control delay exceeding 80.0 seconds/vehicle and a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.	>80

Source: Highway Capacity Manual 2010

Unsignalized Intersections

The HCM 2010 procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, i. e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

All-Way Stop Controlled Intersections

All-way stop controlled intersections is a form of traffic controls in which all approaches to an intersection are required to stop. Similar to signalized intersections, at all-way stop controlled intersections the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection as a whole. In other words the delay measured for all-way stop controlled intersections is a measure of the average delay for all vehicles passing through the intersection during the peak hour. A LOS designation is given to the weighted average control delay to better describe the level of operation.

Two-Way Stop Controlled Intersections

Two-way stop controlled (TWSC) intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At TWSC intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay are determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A LOS for TWSC intersection is determined by the computed or measured control delay for each minor movement. LOS is not defined for the intersection as a whole for three main reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at the typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay from all vehicles; and (c) the resulting low delay can mask important LOS deficiencies for minor movements. Table A-3 provides a description of LOS at unsignalized intersections.

Table A-3: Unsignalized Intersection Level of Service Description (Automobile Mode)

Control Delay (seconds per vehicle)	LOS by Volume-to-Capacity Ratio	
	v/c $\leq$ 1.0	v/c > 1.0
≤10	A	F
>10 to 15	B	F
>15 to 25	C	F
>25 to 35	D	F
>35 to 50	E	F
>50	F	F

Source: HCM 2010 Exhibit 19-1.

Appendix E: Existing Traffic Conditions

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	885	25	6	509	14	11
Future Vol, veh/h	885	25	6	509	14	11
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1079	30	7	621	17	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1114	0	1424	560
Stage 1	-	-	-	-	1099	-
Stage 2	-	-	-	-	325	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	628	-	128	474
Stage 1	-	-	-	-	283	-
Stage 2	-	-	-	-	708	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	625	-	125	472
Mov Cap-2 Maneuver	-	-	-	-	125	-
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	696	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	28.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	185	-	-	625	-
HCM Lane V/C Ratio	0.165	-	-	0.012	-
HCM Control Delay (s)	28.3	-	-	10.8	0.1
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

Intersection						
Int Delay, s/veh	1.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	871	25	6	485	30	50
Future Vol, veh/h	871	25	6	485	30	50
Conflicting Peds, #/hr	0	4	4	0	4	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1013	29	7	564	35	58

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1046	0	1332	529
Stage 1	-	-	-	-	1032	-
Stage 2	-	-	-	-	300	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	667	-	147	497
Stage 1	-	-	-	-	307	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	664	-	144	493
Mov Cap-2 Maneuver	-	-	-	-	144	-
Stage 1	-	-	-	-	306	-
Stage 2	-	-	-	-	714	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	26.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	258	-	-	664	-
HCM Lane V/C Ratio	0.361	-	-	0.011	-
HCM Control Delay (s)	26.6	-	-	10.5	0.1
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	1.6	-	-	0	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	6	0	21	7	1	50	9	48	693	35	7	57	1017	38
Future Vol, veh/h	6	0	21	7	1	50	9	48	693	35	7	57	1017	38
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	92	84	84	84	92	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	7	0	25	8	1	60	10	57	825	42	8	68	1211	45

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1860	2400	636	1621	2401	440	917	1264	0	0	633	872	0	0
Stage 1	1394	1394	-	985	985	-	-	-	-	-	-	-	-	-
Stage 2	466	1006	-	636	1416	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	78	33	362	110	33	485	497	294	-	-	711	454	-	-
Stage 1	106	209	-	205	327	-	-	-	-	-	-	-	-	-
Stage 2	502	319	-	396	204	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	48	21	359	75	21	482	309	309	-	-	466	466	-	-
Mov Cap-2 Maneuver	48	21	-	75	21	-	-	-	-	-	-	-	-	-
Stage 1	82	174	-	160	255	-	-	-	-	-	-	-	-	-
Stage 2	343	249	-	309	170	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36.2	26.3	1.4	0.8
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	309	-	-	147	237	466	-	-
HCM Lane V/C Ratio	0.217	-	-	0.219	0.291	0.162	-	-
HCM Control Delay (s)	19.8	-	-	36.2	26.3	14.2	-	-
HCM Lane LOS	C	-	-	E	D	B	-	-
HCM 95th %tile Q(veh)	0.8	-	-	0.8	1.2	0.6	-	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	74	77	106	595	766	287
Future Volume (vph)	74	77	106	595	766	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0	4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.95	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1523	1787	5036	5036	1551
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1523	1787	5036	5036	1551
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	96	100	138	773	995	373
RTOR Reduction (vph)	0	81	0	0	0	187
Lane Group Flow (vph)	96	19	138	773	995	186
Confl. Peds. (#/hr)		79	7			7
Heavy Vehicles (%)	1%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	9.5	9.7	6.6	33.3	22.5	22.5
Effective Green, g (s)	9.5	9.7	6.6	33.3	22.5	22.5
Actuated g/C Ratio	0.18	0.19	0.13	0.64	0.43	0.43
Clearance Time (s)	4.2	4.0	4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	327	284	227	3231	2183	672
v/s Ratio Prot	c0.05		c0.08	0.15	c0.20	
v/s Ratio Perm		0.01				0.12
v/c Ratio	0.29	0.07	0.61	0.24	0.46	0.28
Uniform Delay, d1	18.3	17.4	21.4	3.9	10.4	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1	4.6	0.0	0.2	0.2
Delay (s)	18.8	17.5	26.0	4.0	10.5	9.7
Level of Service	B	B	C	A	B	A
Approach Delay (s)	18.1			7.3	10.3	
Approach LOS	B			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	51.9	Sum of lost time (s)	13.3
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	1	1	48	5	11	45	22	106	720	35	3	24	819	30
Future Vol, veh/h	1	1	48	5	11	45	22	106	720	35	3	24	819	30
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	1	1	58	6	13	54	27	128	867	42	4	29	987	36

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1747	2305	527	1663	2302	457	747	1036	0	0	664	911	0	0
Stage 1	1084	1084	-	1200	1200	-	-	-	-	-	-	-	-	-
Stage 2	663	1221	-	463	1102	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	92	38	426	103	39	473	616	379	-	-	684	435	-	-
Stage 1	175	293	-	145	258	-	-	-	-	-	-	-	-	-
Stage 2	381	253	-	504	288	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	29	21	420	56	22	472	395	395	-	-	449	449	-	-
Mov Cap-2 Maneuver	29	21	-	56	22	-	-	-	-	-	-	-	-	-
Stage 1	106	268	-	88	157	-	-	-	-	-	-	-	-	-
Stage 2	189	154	-	400	264	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.4	135	2.9	0.4
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	395	-	-	255	89	449	-	-
HCM Lane V/C Ratio	0.39	-	-	0.236	0.826	0.072	-	-
HCM Control Delay (s)	19.8	-	-	23.4	135	13.6	-	-
HCM Lane LOS	C	-	-	C	F	B	-	-
HCM 95th %tile Q(veh)	1.8	-	-	0.9	4.4	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	365	59	99	366	203	99	480	82	201	488	205
Future Volume (veh/h)	200	365	59	99	366	203	99	480	82	201	488	205
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	238	435	70	118	436	242	118	571	98	239	581	244
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	283	1090	485	152	795	355	152	959	298	284	1386	429
Arrive On Green	0.16	0.31	0.31	0.09	0.23	0.23	0.09	0.19	0.19	0.16	0.27	0.27
Sat Flow, veh/h	1767	3526	1568	1767	3526	1572	1767	5066	1572	1767	5066	1567
Grp Volume(v), veh/h	238	435	70	118	436	242	118	571	98	239	581	244
Grp Sat Flow(s),veh/h/ln	1767	1763	1568	1767	1763	1572	1767	1689	1572	1767	1689	1567
Q Serve(g_s), s	9.7	7.2	2.4	4.9	8.1	10.5	4.9	7.7	3.0	9.8	7.0	6.0
Cycle Q Clear(g_c), s	9.7	7.2	2.4	4.9	8.1	10.5	4.9	7.7	3.0	9.8	7.0	6.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	283	1090	485	152	795	355	152	959	298	284	1386	429
V/C Ratio(X)	0.84	0.40	0.14	0.77	0.55	0.68	0.77	0.60	0.33	0.84	0.42	0.57
Avail Cap(c_a), veh/h	399	1855	825	373	1802	804	373	2058	639	399	2133	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	20.2	18.6	33.3	25.4	26.3	33.3	27.5	14.4	30.3	22.2	8.3
Incr Delay (d2), s/veh	10.6	0.2	0.1	8.1	0.6	2.3	8.1	0.6	0.6	10.7	0.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	2.7	0.8	2.3	3.2	3.8	2.3	2.9	1.4	4.7	2.6	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.9	20.5	18.7	41.4	26.0	28.7	41.4	28.1	15.0	41.0	22.4	9.5
LnGrp LOS	D	C	B	D	C	C	D	C	B	D	C	A
Approach Vol, veh/h		743			796			787			1064	
Approach Delay, s/veh		26.8			29.1			28.5			23.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.9	19.0	10.6	27.9	10.6	25.2	16.8	21.7
Change Period (Y+Rc), s	4.9	* 4.9	* 4.2	4.9	* 4.2	4.9	4.9	* 4.9
Max Green Setting (Gmax), s	16.8	* 30	* 16	39.1	* 16	31.3	16.8	* 38
Max Q Clear Time (g_c+I1), s	11.8	9.7	6.9	9.2	6.9	9.0	11.7	12.5
Green Ext Time (p_c), s	0.3	3.9	0.2	3.1	0.2	4.6	0.3	3.6

Intersection Summary			
HCM 6th Ctrl Delay			26.7
HCM 6th LOS			C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	672	18	10	862	21	14
Future Vol, veh/h	672	18	10	862	21	14
Conflicting Peds, #/hr	0	7	7	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	686	18	10	880	21	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	711	0	1162	359
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	460	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	891	-	190	640
Stage 1	-	-	-	-	455	-
Stage 2	-	-	-	-	605	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	885	-	184	636
Mov Cap-2 Maneuver	-	-	-	-	184	-
Stage 1	-	-	-	-	452	-
Stage 2	-	-	-	-	592	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	21.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	257	-	-	885	-
HCM Lane V/C Ratio	0.139	-	-	0.012	-
HCM Control Delay (s)	21.3	-	-	9.1	0.1
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	664	22	17	836	36	48
Future Vol, veh/h	664	22	17	836	36	48
Conflicting Peds, #/hr	0	4	2	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	738	24	19	929	40	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	766	0	1259	387
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	505	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	850	-	164	614
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	574	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	847	-	155	610
Mov Cap-2 Maneuver	-	-	-	-	155	-
Stage 1	-	-	-	-	426	-
Stage 2	-	-	-	-	546	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	25.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	270	-	-	847	-
HCM Lane V/C Ratio	0.346	-	-	0.022	-
HCM Control Delay (s)	25.2	-	-	9.3	0.2
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	1.5	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	14	4	48	9	2	35	12	12	1238	13	7	21	883	6
Future Vol, veh/h	14	4	48	9	2	35	12	12	1238	13	7	21	883	6
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	15	4	52	10	2	38	13	13	1331	14	8	23	949	6

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1608	2438	488	1853	2434	691	698	964	0	0	982	1363	0	0
Stage 1	1023	1023	-	1408	1408	-	-	-	-	-	-	-	-	-
Stage 2	585	1415	-	445	1026	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	112	32	452	79	32	334	655	410	-	-	457	263	-	-
Stage 1	193	313	-	104	205	-	-	-	-	-	-	-	-	-
Stage 2	425	204	-	516	312	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	81	26	448	53	26	328	479	479	-	-	284	284	-	-
Mov Cap-2 Maneuver	81	26	-	53	26	-	-	-	-	-	-	-	-	-
Stage 1	181	277	-	97	191	-	-	-	-	-	-	-	-	-
Stage 2	352	190	-	402	276	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	47.9	48.8	0.2	0.6
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	479	-	-	152	130	284	-	-
HCM Lane V/C Ratio	0.054	-	-	0.467	0.38	0.106	-	-
HCM Control Delay (s)	12.9	-	-	47.9	48.8	19.2	-	-
HCM Lane LOS	B	-	-	E	E	C	-	-
HCM 95th %tile Q(veh)	0.2	-	-	2.2	1.6	0.4	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	175	147	4	49	1098	914	146
Future Volume (vph)	175	147	4	49	1098	914	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1563		1779	5036	5036	1547
Flt Permitted	0.95	1.00		0.85	1.00	1.00	1.00
Satd. Flow (perm)	1787	1563		1593	5036	5036	1547
Peak-hour factor, PHF	0.95	0.95	0.92	0.95	0.95	0.95	0.95
Adj. Flow (vph)	184	155	4	52	1156	962	154
RTOR Reduction (vph)	0	115	0	0	0	0	85
Lane Group Flow (vph)	184	40	0	56	1156	962	69
Confl. Peds. (#/hr)		24		9			9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	1%
Turn Type	Prot	Perm	custom	Prot	NA	NA	Perm
Protected Phases	7			5	2	6	
Permitted Phases		4	5				6
Actuated Green, G (s)	13.2	13.4		4.7	29.2	20.3	20.3
Effective Green, g (s)	13.2	13.4		4.7	29.2	20.3	20.3
Actuated g/C Ratio	0.26	0.26		0.09	0.57	0.39	0.39
Clearance Time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	458	406		145	2855	1985	609
v/s Ratio Prot	c0.10				c0.23	c0.19	
v/s Ratio Perm		0.03		0.04			0.04
v/c Ratio	0.40	0.10		0.39	0.40	0.48	0.11
Uniform Delay, d1	15.9	14.5		22.0	6.3	11.7	9.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1		1.7	0.1	0.2	0.1
Delay (s)	16.5	14.6		23.8	6.4	11.9	10.0
Level of Service	B	B		C	A	B	A
Approach Delay (s)	15.6				7.2	11.6	
Approach LOS	B				A	B	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	51.5	Sum of lost time (s)	13.3
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	10.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	3	2	104	22	4	58	25	48	1027	28	20	38	912	13
Future Vol, veh/h	3	2	104	22	4	58	25	48	1027	28	20	38	912	13
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	3	2	117	25	4	65	28	54	1154	31	22	43	1025	15

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1799	2529	526	1886	2521	606	759	1046	0	0	865	1196	0	0
Stage 1	1169	1169	-	1345	1345	-	-	-	-	-	-	-	-	-
Stage 2	630	1360	-	541	1176	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	85	28	427	76	28	379	607	375	-	-	531	317	-	-
Stage 1	153	267	-	115	220	-	-	-	-	-	-	-	-	-
Stage 2	399	217	-	452	265	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	41	18	425	36	18	374	398	398	-	-	350	350	-	-
Mov Cap-2 Maneuver	41	18	-	36	18	-	-	-	-	-	-	-	-	-
Stage 1	121	216	-	90	173	-	-	-	-	-	-	-	-	-
Stage 2	254	171	-	264	214	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.7	219.8	1.1	1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	398	-	-	254	85	350	-	-
HCM Lane V/C Ratio	0.206	-	-	0.482	1.11	0.186	-	-
HCM Control Delay (s)	16.4	-	-	31.7	219.8	17.6	-	-
HCM Lane LOS	C	-	-	D	F	C	-	-
HCM 95th %tile Q(veh)	0.8	-	-	2.4	6.6	0.7	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑↑	↱	↰	↑↑↑	↱
Traffic Volume (veh/h)	183	249	28	101	379	189	90	756	88	228	629	206
Future Volume (veh/h)	183	249	28	101	379	189	90	756	88	228	629	206
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	199	271	30	110	412	205	98	822	96	248	684	224
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	237	881	393	141	671	299	126	1316	405	286	1802	556
Arrive On Green	0.13	0.25	0.25	0.08	0.19	0.19	0.07	0.26	0.26	0.16	0.36	0.36
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1767	5066	1560	1767	5066	1563
Grp Volume(v), veh/h	199	271	30	110	412	205	98	822	96	248	684	224
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1767	1689	1560	1767	1689	1563
Q Serve(g_s), s	8.5	4.8	1.1	4.7	8.3	9.4	4.2	11.1	2.7	10.6	7.8	4.9
Cycle Q Clear(g_c), s	8.5	4.8	1.1	4.7	8.3	9.4	4.2	11.1	2.7	10.6	7.8	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	881	393	141	671	299	126	1316	405	286	1802	556
V/C Ratio(X)	0.84	0.31	0.08	0.78	0.61	0.68	0.78	0.62	0.24	0.87	0.38	0.40
Avail Cap(c_a), veh/h	241	1759	785	229	1736	775	211	1983	611	286	2200	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	23.5	22.1	34.9	28.6	29.1	35.2	25.2	11.9	31.5	18.5	6.6
Incr Delay (d2), s/veh	22.3	0.2	0.1	9.1	0.9	2.8	9.9	0.5	0.3	23.3	0.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	1.9	0.4	2.3	3.3	3.5	2.1	4.2	1.3	6.1	2.8	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.9	23.7	22.2	44.0	29.5	31.8	45.1	25.7	12.2	54.8	18.6	7.1
LnGrp LOS	D	C	C	D	C	C	D	C	B	D	B	A
Approach Vol, veh/h		500			727			1016			1156	
Approach Delay, s/veh		36.0			32.4			26.3			24.2	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.4	24.9	10.6	24.2	10.0	32.3	15.2	19.6
Change Period (Y+Rc), s	4.9	* 4.9	4.5	4.9	4.5	4.9	4.9	* 4.9
Max Green Setting (Gmax), s	12.5	* 30	10.0	38.5	9.2	33.5	10.5	* 38
Max Q Clear Time (g_c+I1), s	12.6	13.1	6.7	6.8	6.2	9.8	10.5	11.4
Green Ext Time (p_c), s	0.0	5.3	0.1	1.8	0.1	5.4	0.0	3.3

Intersection Summary		
HCM 6th Ctrl Delay		28.3
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	74	77	5	117	595	766	287
Future Volume (vph)	74	77	5	117	595	766	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.95		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1521		1781	5036	5036	1551
Flt Permitted	0.95	1.00		0.43	1.00	1.00	1.00
Satd. Flow (perm)	1787	1521		815	5036	5036	1551
Peak-hour factor, PHF	0.77	0.77	0.92	0.77	0.77	0.77	0.77
Adj. Flow (vph)	96	100	5	152	773	995	373
RTOR Reduction (vph)	0	81	0	0	0	0	200
Lane Group Flow (vph)	96	19	0	157	773	995	173
Confl. Peds. (#/hr)		79		7			7
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	1%
Turn Type	Prot	Perm	custom	Prot	NA	NA	Perm
Protected Phases	7			5	2	6	
Permitted Phases		4	5				6
Actuated Green, G (s)	10.0	10.2		9.2	34.6	21.2	21.2
Effective Green, g (s)	10.0	10.2		9.2	34.6	21.2	21.2
Actuated g/C Ratio	0.19	0.19		0.17	0.64	0.39	0.39
Clearance Time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	332	288		139	3244	1988	612
v/s Ratio Prot	c0.05				0.15	c0.20	
v/s Ratio Perm		0.01		c0.19			0.11
v/c Ratio	0.29	0.07		1.13	0.24	0.50	0.28
Uniform Delay, d1	18.8	17.8		22.2	4.0	12.3	11.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1		115.3	0.0	0.2	0.3
Delay (s)	19.3	17.9		137.6	4.1	12.5	11.3
Level of Service	B	B		F	A	B	B
Approach Delay (s)	18.6				26.6	12.1	
Approach LOS	B				C	B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	13.3
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	50	0	0	61	22	106	721	36	3	24	824	30
Future Vol, veh/h	0	0	50	0	0	61	22	106	721	36	3	24	824	30
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	60	0	0	73	27	128	869	43	4	29	993	36

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1748	2314	530	1668	2311	458	751	1042	0	0	666	914	0	0
Stage 1	1090	1090	-	1203	1203	-	-	-	-	-	-	-	-	-
Stage 2	658	1224	-	465	1108	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	92	38	425	103	38	472	613	376	-	-	682	434	-	-
Stage 1	174	291	-	145	258	-	-	-	-	-	-	-	-	-
Stage 2	384	252	-	502	286	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	50	21	419	58	21	471	392	392	-	-	446	446	-	-
Mov Cap-2 Maneuver	50	21	-	58	21	-	-	-	-	-	-	-	-	-
Stage 1	104	266	-	88	156	-	-	-	-	-	-	-	-	-
Stage 2	197	153	-	397	262	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	14.1	2.9	0.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	392	-	-	419	471	446	-	-
HCM Lane V/C Ratio	0.393	-	-	0.144	0.156	0.073	-	-
HCM Control Delay (s)	20	-	-	15	14.1	13.7	-	-
HCM Lane LOS	C	-	-	C	B	B	-	-
HCM 95th %tile Q(veh)	1.8	-	-	0.5	0.5	0.2	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	175	147	26	53	1098	914	146
Future Volume (vph)	175	147	26	53	1098	914	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1561		1769	5036	5036	1545
Flt Permitted	0.95	1.00		0.43	1.00	1.00	1.00
Satd. Flow (perm)	1787	1561		801	5036	5036	1545
Peak-hour factor, PHF	0.95	0.95	0.92	0.95	0.95	0.95	0.95
Adj. Flow (vph)	184	155	28	56	1156	962	154
RTOR Reduction (vph)	0	117	0	0	0	0	91
Lane Group Flow (vph)	184	38	0	84	1156	962	63
Confl. Peds. (#/hr)		24		9			9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	1%
Turn Type	Prot	Perm	custom	Prot	NA	NA	Perm
Protected Phases	7			5	2	6	
Permitted Phases		4	5				6
Actuated Green, G (s)	13.6	13.8		9.3	33.0	19.5	19.5
Effective Green, g (s)	13.6	13.8		9.3	33.0	19.5	19.5
Actuated g/C Ratio	0.24	0.25		0.17	0.59	0.35	0.35
Clearance Time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	436	386		133	2983	1763	540
v/s Ratio Prot	c0.10				0.23	c0.19	
v/s Ratio Perm		0.02		c0.10			0.04
v/c Ratio	0.42	0.10		0.63	0.39	0.55	0.12
Uniform Delay, d1	17.7	16.2		21.6	6.0	14.5	12.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1		9.4	0.1	0.3	0.1
Delay (s)	18.4	16.3		31.0	6.1	14.9	12.4
Level of Service	B	B		C	A	B	B
Approach Delay (s)	17.4				7.8	14.5	
Approach LOS	B				A	B	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	55.7	Sum of lost time (s)	13.3
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	109	0	0	84	25	48	1030	30	20	38	934	13
Future Vol, veh/h	0	0	109	0	0	84	25	48	1030	30	20	38	934	13
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	122	0	0	94	28	54	1157	34	22	43	1049	15

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1822	2559	538	1899	2549	609	777	1070	0	0	869	1202	0	0
Stage 1	1193	1193	-	1349	1349	-	-	-	-	-	-	-	-	-
Stage 2	629	1366	-	550	1200	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	83	26	420	74	27	377	593	365	-	-	528	315	-	-
Stage 1	147	260	-	114	219	-	-	-	-	-	-	-	-	-
Stage 2	400	215	-	446	258	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	44	16	418	37	17	372	386	386	-	-	340	340	-	-
Mov Cap-2 Maneuver	44	16	-	37	17	-	-	-	-	-	-	-	-	-
Stage 1	115	209	-	89	171	-	-	-	-	-	-	-	-	-
Stage 2	235	167	-	255	207	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.1	17.9	1.1	1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	386	-	-	418	372	340	-	-
HCM Lane V/C Ratio	0.212	-	-	0.293	0.254	0.192	-	-
HCM Control Delay (s)	16.8	-	-	17.1	17.9	18.1	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	0.8	-	-	1.2	1	0.7	-	-

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	52	31
Average Queue (ft)	5	11
95th Queue (ft)	29	36
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	EB	EB	WB	NB
Directions Served	T	TR	LT	LR
Maximum Queue (ft)	31	47	140	72
Average Queue (ft)	2	3	11	34
95th Queue (ft)	15	19	59	60
Link Distance (ft)	281	281	745	635
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	SB	SB	SB
Directions Served	LTR	LTR	UL	UL	T	TR
Maximum Queue (ft)	52	97	75	53	30	21
Average Queue (ft)	20	37	36	25	1	1
95th Queue (ft)	50	69	67	43	10	7
Link Distance (ft)	1033	1240			898	898
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			75	75		
Storage Blk Time (%)			2			
Queuing Penalty (veh)			4			

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	T	T	T	R
Maximum Queue (ft)	71	64	185	119	136	161	221	188	158	113
Average Queue (ft)	45	28	82	41	56	73	140	103	86	61
95th Queue (ft)	74	55	157	99	111	129	212	163	145	99
Link Distance (ft)		850		608	608	608	270	270	270	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	105		395							100
Storage Blk Time (%)									8	1
Queuing Penalty (veh)									22	2

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	UL	UL	T	T	TR
Maximum Queue (ft)	74	69	96	31	75	76	51
Average Queue (ft)	32	31	40	13	4	3	2
95th Queue (ft)	62	54	82	37	30	25	17
Link Distance (ft)	407	1233			608	608	608
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			85	75			
Storage Blk Time (%)			0		0		
Queuing Penalty (veh)			1		0		

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (ft)	223	150	137	37	158	191	151	158	131	195	176	146
Average Queue (ft)	114	84	74	13	63	112	83	48	62	108	89	43
95th Queue (ft)	184	133	129	28	113	178	150	98	107	165	150	105
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)			0				2	0		0		0
Queuing Penalty (veh)			0				5	0		0		0

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (ft)	55	231	139	158	150	124
Average Queue (ft)	22	108	77	100	81	55
95th Queue (ft)	41	189	127	151	139	102
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		1			4	1
Queuing Penalty (veh)		2			7	1

Network Summary

Network wide Queuing Penalty: 45

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	30	53
Average Queue (ft)	3	27
95th Queue (ft)	16	52
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	94	55
Average Queue (ft)	19	37
95th Queue (ft)	63	54
Link Distance (ft)	745	635
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	UL	UL	T
Maximum Queue (ft)	162	54	54	59	89
Average Queue (ft)	45	27	13	20	4
95th Queue (ft)	88	54	39	51	31
Link Distance (ft)	1033	1240			898
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			75	75	
Storage Blk Time (%)				1	0
Queuing Penalty (veh)				2	0

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	T	T	T	R
Maximum Queue (ft)	135	180	98	205	204	261	270	269	120	76
Average Queue (ft)	71	49	53	65	78	99	148	94	66	41
95th Queue (ft)	126	104	92	155	161	198	219	195	115	67
Link Distance (ft)		850		608	608	608	270	270	270	
Upstream Blk Time (%)							0	0		
Queuing Penalty (veh)							0	0		
Storage Bay Dist (ft)	105		395							100
Storage Blk Time (%)	3	1							3	
Queuing Penalty (veh)	5	1							4	

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	UL	UL	TR
Maximum Queue (ft)	98	76	53	52	31
Average Queue (ft)	44	39	26	22	1
95th Queue (ft)	69	64	55	52	10
Link Distance (ft)	407	1233			608
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			85	75	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (ft)	266	103	90	18	151	179	143	162	155	211	254	192
Average Queue (ft)	118	55	43	5	62	113	74	51	71	134	126	75
95th Queue (ft)	215	90	79	17	114	169	132	105	139	188	190	148
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	1						1	0		1		
Queuing Penalty (veh)	1						3	1		1		

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (ft)	60	272	121	188	176	134
Average Queue (ft)	22	173	74	100	102	47
95th Queue (ft)	45	266	120	148	153	92
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		5			7	1
Queuing Penalty (veh)		11			14	1

Network Summary

Network wide Queuing Penalty: 44

Appendix F: Existing plus Project Traffic Conditions

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	914	43	8	514	23	13
Future Vol, veh/h	914	43	8	514	23	13
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1115	52	10	627	28	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1172	0	1480	589
Stage 1	-	-	-	-	1146	-
Stage 2	-	-	-	-	334	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	597	-	117	454
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	700	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	594	-	113	452
Mov Cap-2 Maneuver	-	-	-	-	113	-
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	682	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	37.2
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	155	-	-	594	-
HCM Lane V/C Ratio	0.283	-	-	0.016	-
HCM Control Delay (s)	37.2	-	-	11.2	0.1
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	878	49	23	489	34	55
Future Vol, veh/h	878	49	23	489	34	55
Conflicting Peds, #/hr	0	4	4	0	4	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1021	57	27	569	40	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1082	0	1397	547
Stage 1	-	-	-	-	1054	-
Stage 2	-	-	-	-	343	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	646	-	133	484
Stage 1	-	-	-	-	299	-
Stage 2	-	-	-	-	693	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	644	-	124	480
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	298	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	33.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	229	-	-	644	-
HCM Lane V/C Ratio	0.452	-	-	0.042	-
HCM Control Delay (s)	33.1	-	-	10.8	0.3
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	2.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	28.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	28	0	42	7	2	50	9	115	714	35	7	57	1072	102
Future Vol, veh/h	28	0	42	7	2	50	9	115	714	35	7	57	1072	102
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	33	0	50	8	2	60	11	137	850	42	8	68	1276	121

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2135	2690	707	1834	2729	452	1020	1405	0	0	651	897	0	0
Stage 1	1497	1497	-	1172	1172	-	-	-	-	-	-	-	-	-
Stage 2	638	1193	-	662	1557	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	53	22	326	81	20	477	436	251	-	-	695	442	-	-
Stage 1	90	186	-	152	267	-	-	-	-	-	-	-	-	-
Stage 2	395	260	-	382	174	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	~ 17	8	324	33	7	474	255	255	-	-	455	455	-	-
Mov Cap-2 Maneuver	~ 17	8	-	33	7	-	-	-	-	-	-	-	-	-
Stage 1	38	154	-	64	112	-	-	-	-	-	-	-	-	-
Stage 2	142	109	-	269	144	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 745.7	104.1	5.2	0.8
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	255	-	-	39	98	455	-	-
HCM Lane V/C Ratio	0.579	-	-	2.137	0.717	0.167	-	-
HCM Control Delay (s)	36.8	-	-	$ 745.7	104.1	14.5	-	-
HCM Lane LOS	E	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	3.3	-	-	9	3.7	0.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	92	128	275	665	780	349
Future Volume (vph)	92	128	275	665	780	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0	4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.94	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1509	1787	5036	5036	1547
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1509	1787	5036	5036	1547
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	119	166	357	864	1013	453
RTOR Reduction (vph)	0	134	0	0	0	216
Lane Group Flow (vph)	119	32	357	864	1013	237
Confl. Peds. (#/hr)		79	7			7
Heavy Vehicles (%)	1%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.3	12.5	18.1	43.1	20.8	20.8
Effective Green, g (s)	12.3	12.5	18.1	43.1	20.8	20.8
Actuated g/C Ratio	0.19	0.19	0.28	0.67	0.32	0.32
Clearance Time (s)	4.2	4.0	4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	340	292	501	3365	1624	498
v/s Ratio Prot	c0.07		c0.20	0.17	c0.20	
v/s Ratio Perm		0.02				0.15
v/c Ratio	0.35	0.11	0.71	0.26	0.62	0.48
Uniform Delay, d1	22.6	21.4	20.9	4.3	18.5	17.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.2	4.8	0.0	0.8	0.7
Delay (s)	23.3	21.6	25.6	4.3	19.3	18.2
Level of Service	C	C	C	A	B	B
Approach Delay (s)	22.3			10.6	19.0	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	64.5	Sum of lost time (s)	13.3
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	16.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	4	1	47	5	11	46	22	117	955	35	3	24	885	29
Future Vol, veh/h	4	1	47	5	11	46	22	117	955	35	3	24	885	29
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	5	1	57	6	13	55	27	141	1151	42	4	29	1066	35

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1966	2694	566	2005	2690	599	804	1114	0	0	871	1195	0	0
Stage 1	1163	1163	-	1510	1510	-	-	-	-	-	-	-	-	-
Stage 2	803	1531	-	495	1180	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	67	22	402	64	22	383	573	347	-	-	527	317	-	-
Stage 1	154	269	-	88	183	-	-	-	-	-	-	-	-	-
Stage 2	313	179	-	482	264	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	10	396	30	~ 10	382	361	361	-	-	328	328	-	-
Mov Cap-2 Maneuver	-	10	-	30	~ 10	-	-	-	-	-	-	-	-	-
Stage 1	82	239	-	47	98	-	-	-	-	-	-	-	-	-
Stage 2	124	96	-	369	234	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		$ 519.5	2.9	0.5
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	361	-	-	-	45	328	-	-
HCM Lane V/C Ratio	0.464	-	-	-	1.66	0.099	-	-
HCM Control Delay (s)	23.3	-	-	-	$ 519.5	17.2	-	-
HCM Lane LOS	C	-	-	-	F	C	-	-
HCM 95th %tile Q(veh)	2.4	-	-	-	7.5	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	365	59	99	341	257	87	602	82	213	521	225
Future Volume (veh/h)	270	365	59	99	341	257	87	602	82	213	521	225
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	321	435	70	118	406	306	104	717	98	254	620	268
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	331	1255	559	149	866	386	132	1038	322	275	1486	460
Arrive On Green	0.19	0.36	0.36	0.08	0.25	0.25	0.07	0.20	0.20	0.16	0.29	0.29
Sat Flow, veh/h	1767	3526	1569	1767	3526	1572	1767	5066	1572	1767	5066	1568
Grp Volume(v), veh/h	321	435	70	118	406	306	104	717	98	254	620	268
Grp Sat Flow(s),veh/h/ln	1767	1763	1569	1767	1763	1572	1767	1689	1572	1767	1689	1568
Q Serve(g_s), s	17.1	8.6	2.9	6.2	9.3	17.3	5.5	12.5	3.9	13.5	9.4	8.2
Cycle Q Clear(g_c), s	17.1	8.6	2.9	6.2	9.3	17.3	5.5	12.5	3.9	13.5	9.4	8.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	1255	559	149	866	386	132	1038	322	275	1486	460
V/C Ratio(X)	0.97	0.35	0.13	0.79	0.47	0.79	0.79	0.69	0.30	0.92	0.42	0.58
Avail Cap(c_a), veh/h	331	1488	662	292	1410	629	255	1664	516	275	1722	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	22.5	20.6	42.7	30.6	33.6	43.2	35.0	19.2	39.5	27.0	9.9
Incr Delay (d2), s/veh	41.1	0.2	0.1	9.1	0.4	3.7	9.8	0.8	0.5	34.4	0.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.9	3.4	1.0	3.0	3.8	6.7	2.7	5.0	1.9	8.2	3.6	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.5	22.6	20.7	51.8	31.0	37.3	53.0	35.8	19.7	74.0	27.2	11.1
LnGrp LOS	E	C	C	D	C	D	D	D	B	E	C	B
Approach Vol, veh/h		826			830			919			1142	
Approach Delay, s/veh		44.6			36.3			36.0			33.8	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.7	24.4	12.2	38.7	11.3	32.8	22.7	28.2
Change Period (Y+Rc), s	4.9	* 4.9	* 4.2	4.9	* 4.2	4.9	4.9	* 4.9
Max Green Setting (Gmax), s	14.8	* 31	* 16	40.1	* 14	32.3	17.8	* 38
Max Q Clear Time (g_c+I1), s	15.5	14.5	8.2	10.6	7.5	11.4	19.1	19.3
Green Ext Time (p_c), s	0.0	4.6	0.1	3.1	0.1	4.9	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	37.3
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	692	32	11	873	32	15
Future Vol, veh/h	692	32	11	873	32	15
Conflicting Peds, #/hr	0	7	7	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	706	33	11	891	33	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	746	0	1198	377
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	468	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	865	-	180	624
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	599	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	859	-	174	620
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	584	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		25.2	
HCM LOS					D	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	226	-	-	859	-
HCM Lane V/C Ratio	0.212	-	-	0.013	-
HCM Control Delay (s)	25.2	-	-	9.2	0.1
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0	-

Intersection						
Int Delay, s/veh	2.1					
Movement	**EBT**	**EBR**	**WBL**	**WBT**	**NBL**	**NBR**
Lane Configurations						
Traffic Vol, veh/h	670	37	30	843	42	57
Future Vol, veh/h	670	37	30	843	42	57
Conflicting Peds, #/hr	0	4	2	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	744	41	33	937	47	63

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	789	0	1306	399
Stage 1	-	-	-	-	769	-
Stage 2	-	-	-	-	537	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	833	-	153	603
Stage 1	-	-	-	-	420	-
Stage 2	-	-	-	-	553	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	830	-	140	600
Mov Cap-2 Maneuver	-	-	-	-	140	-
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	506	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	30.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	251	-	-	830	-
HCM Lane V/C Ratio	0.438	-	-	0.04	-
HCM Control Delay (s)	30.1	-	-	9.5	0.4
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	22.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	48	4	82	9	3	35	12	61	1275	13	7	21	929	52
Future Vol, veh/h	48	4	82	9	3	35	12	61	1275	13	7	21	929	52
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	52	4	88	10	3	38	13	66	1371	14	8	23	999	56

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1806	2659	538	2019	2680	711	770	1064	0	0	1011	1403	0	0
Stage 1	1098	1098	-	1554	1554	-	-	-	-	-	-	-	-	-
Stage 2	708	1561	-	465	1126	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	85	23	420	63	22	324	598	367	-	-	441	251	-	-
Stage 1	171	289	-	82	174	-	-	-	-	-	-	-	-	-
Stage 2	358	173	-	502	280	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	~ 48	16	416	30	15	318	379	379	-	-	272	272	-	-
Mov Cap-2 Maneuver	~ 48	16	-	30	15	-	-	-	-	-	-	-	-	-
Stage 1	135	255	-	64	136	-	-	-	-	-	-	-	-	-
Stage 2	245	135	-	346	247	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 372.9	115.1	0.9	0.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	379	-	-	93	77	272	-	-
HCM Lane V/C Ratio	0.207	-	-	1.549	0.656	0.111	-	-
HCM Control Delay (s)	17	-	-	$ 372.9	115.1	19.9	-	-
HCM Lane LOS	C	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	0.8	-	-	11.2	3	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	210	236	4	178	1149	942	198
Future Volume (vph)	210	236	4	178	1149	942	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1562		1786	5036	5036	1546
Flt Permitted	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1562		1786	5036	5036	1546
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	248	4	187	1209	992	208
RTOR Reduction (vph)	0	182	0	0	0	0	124
Lane Group Flow (vph)	221	66	0	191	1209	992	84
Confl. Peds. (#/hr)		24		9			9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	NA	Perm
Protected Phases	7		5	5	2	6	
Permitted Phases		4					6
Actuated Green, G (s)	14.3	14.5		10.0	31.4	17.2	17.2
Effective Green, g (s)	14.3	14.5		10.0	31.4	17.2	17.2
Actuated g/C Ratio	0.26	0.26		0.18	0.57	0.31	0.31
Clearance Time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	466	413		325	2885	1580	485
v/s Ratio Prot	c0.12			c0.11	0.24	c0.20	
v/s Ratio Perm		0.04					0.05
v/c Ratio	0.47	0.16		0.59	0.42	0.63	0.17
Uniform Delay, d1	17.1	15.5		20.5	6.6	16.1	13.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2		2.7	0.1	0.8	0.2
Delay (s)	17.8	15.6		23.2	6.7	16.9	13.8
Level of Service	B	B		C	A	B	B
Approach Delay (s)	16.7				8.9	16.3	
Approach LOS	B				A	B	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	13.3
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection														
Int Delay, s/veh	25													

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	5	2	93	22	4	59	25	59	1204	28	20	39	1030	11
Future Vol, veh/h	5	2	93	22	4	59	25	59	1204	28	20	39	1030	11
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	6	2	104	25	4	66	28	66	1353	31	22	44	1157	12

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2034	2884	591	2164	2875	705	854	1175	0	0	1011	1395	0	0
Stage 1	1301	1301	-	1568	1568	-	-	-	-	-	-	-	-	-
Stage 2	733	1583	-	596	1307	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	61	16	388	51	16	327	538	325	-	-	441	253	-	-
Stage 1	124	231	-	80	172	-	-	-	-	-	-	-	-	-
Stage 2	346	169	-	419	230	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	20	9	386	~ 20	9	323	344	344	-	-	279	279	-	-
Mov Cap-2 Maneuver	20	9	-	~ 20	9	-	-	-	-	-	-	-	-	-
Stage 1	90	175	-	58	124	-	-	-	-	-	-	-	-	-
Stage 2	192	122	-	230	174	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	92.4	$ 623.7	1.2	1.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	344	-	-	140	49	279	-	-
HCM Lane V/C Ratio	0.274	-	-	0.803	1.949	0.238	-	-
HCM Control Delay (s)	19.4	-	-	92.4	$ 623.7	21.9	-	-
HCM Lane LOS	C	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	1.1	-	-	5	9.6	0.9	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	241	249	28	101	361	232	80	843	88	250	680	240
Future Volume (veh/h)	241	249	28	101	361	232	80	843	88	250	680	240
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	262	271	30	110	392	252	87	916	96	272	739	261
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	287	1037	463	139	727	324	112	1286	396	303	1856	573
Arrive On Green	0.16	0.29	0.29	0.08	0.21	0.21	0.06	0.25	0.25	0.17	0.37	0.37
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1767	5066	1559	1767	5066	1563
Grp Volume(v), veh/h	262	271	30	110	392	252	87	916	96	272	739	261
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1767	1689	1559	1767	1689	1563
Q Serve(g_s), s	13.9	5.6	1.3	5.8	9.5	14.4	4.6	15.7	3.6	14.4	10.3	7.0
Cycle Q Clear(g_c), s	13.9	5.6	1.3	5.8	9.5	14.4	4.6	15.7	3.6	14.4	10.3	7.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	287	1037	463	139	727	324	112	1286	396	303	1856	573
V/C Ratio(X)	0.91	0.26	0.06	0.79	0.54	0.78	0.78	0.71	0.24	0.90	0.40	0.46
Avail Cap(c_a), veh/h	287	1420	634	280	1406	627	234	1658	510	306	1865	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	25.7	24.2	43.1	33.8	35.8	44.0	32.4	16.4	38.6	22.4	7.8
Incr Delay (d2), s/veh	31.2	0.1	0.1	9.5	0.6	4.0	11.0	1.0	0.3	26.9	0.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	2.3	0.5	2.8	4.0	5.7	2.3	6.2	1.7	8.2	3.9	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	25.9	24.3	52.6	34.4	39.8	55.0	33.4	16.7	65.6	22.5	8.3
LnGrp LOS	E	C	C	D	C	D	D	C	B	E	C	A
Approach Vol, veh/h		563			754			1099			1272	
Approach Delay, s/veh		46.5			38.9			33.7			28.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.3	29.1	12.0	32.9	10.5	39.8	20.4	24.6
Change Period (Y+Rc), s	4.9	* 4.9	4.5	4.9	4.5	4.9	4.9	* 4.9
Max Green Setting (Gmax), s	16.5	* 31	15.1	38.4	12.6	35.1	15.5	* 38
Max Q Clear Time (g_c+I1), s	16.4	17.7	7.8	7.6	6.6	12.3	15.9	16.4
Green Ext Time (p_c), s	0.0	5.3	0.1	1.8	0.1	6.0	0.0	3.2

Intersection Summary	
HCM 6th Ctrl Delay	35.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	70	0	0	59	9	115	742	35	7	57	1079	104
Future Vol, veh/h	0	0	70	0	0	59	9	115	742	35	7	57	1079	104
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	83	0	0	70	11	137	883	42	8	68	1285	124

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	713	-	-	469	1028	1417	0	0	675	930	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	323	0	0	465	431	247	-	-	674	426	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	321	-	-	462	250	250	-	-	437	437	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.1	14.2	5.3	0.8
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	250	-	-	321	462	437	-	-
HCM Lane V/C Ratio	0.59	-	-	0.26	0.152	0.174	-	-
HCM Control Delay (s)	38.3	-	-	20.1	14.2	15	-	-
HCM Lane LOS	E	-	-	C	B	B	-	-
HCM 95th %tile Q(veh)	3.4	-	-	1	0.5	0.6	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	92	128	5	286	665	28	780	349
Future Volume (vph)	92	128	5	286	665	28	780	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.94		1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1505		1787	5036	1752	5036	1546
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1505		1787	5036	1752	5036	1546
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	119	166	6	371	864	36	1013	453
RTOR Reduction (vph)	0	135	0	0	0	0	0	223
Lane Group Flow (vph)	119	31	0	377	864	36	1013	230
Confl. Peds. (#/hr)		79		7				7
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	12.4	12.6		22.1	40.7	2.1	20.7	20.7
Effective Green, g (s)	12.4	12.6		22.1	40.7	2.1	20.7	20.7
Actuated g/C Ratio	0.18	0.18		0.32	0.59	0.03	0.30	0.30
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	323	276		576	2992	53	1521	467
v/s Ratio Prot	c0.07			c0.21	0.17	0.02	c0.20	
v/s Ratio Perm		0.02						0.15
v/c Ratio	0.37	0.11		0.65	0.29	0.68	0.67	0.49
Uniform Delay, d1	24.6	23.3		19.9	6.8	32.9	20.9	19.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2		2.7	0.1	29.4	1.1	0.8
Delay (s)	25.3	23.5		22.6	6.9	62.3	22.0	20.4
Level of Service	C	C		C	A	E	C	C
Approach Delay (s)	24.2				11.6		22.5	
Approach LOS	C				B		C	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	68.5	Sum of lost time (s)	13.3
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	52	0	0	62	22	117	959	36	3	24	890	29
Future Vol, veh/h	0	0	52	0	0	62	22	117	959	36	3	24	890	29
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	63	0	0	75	27	141	1155	43	4	29	1072	35

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	569	-	-	601	808	1120	0	0	875	1200	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	401	0	0	382	570	345	-	-	524	316	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	395	-	-	381	359	359	-	-	325	325	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.8	16.7	2.9	0.5
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	359	-	-	395	381	325	-	-
HCM Lane V/C Ratio	0.466	-	-	0.159	0.196	0.1	-	-
HCM Control Delay (s)	23.5	-	-	15.8	16.7	17.3	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	2.4	-	-	0.6	0.7	0.3	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	134	0	0	47	12	61	1323	17	7	21	938	55
Future Vol, veh/h	0	0	134	0	0	47	12	61	1323	17	7	21	938	55
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	144	0	0	51	13	66	1423	18	8	23	1009	59

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	544	-	-	739	779	1077	0	0	1052	1459	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	416	0	0	311	591	362	-	-	418	236	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	412	-	-	306	365	365	-	-	254	254	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.4	19.1	0.9	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	365	-	-	412	306	254	-	-
HCM Lane V/C Ratio	0.215	-	-	0.35	0.165	0.119	-	-
HCM Control Delay (s)	17.5	-	-	18.4	19.1	21.1	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	0.8	-	-	1.5	0.6	0.4	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	210	236	26	182	1149	52	942	198
Future Volume (vph)	210	236	26	182	1149	52	942	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1561		1783	5036	1752	5036	1545
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1561		1783	5036	1752	5036	1545
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	248	27	192	1209	55	992	208
RTOR Reduction (vph)	0	185	0	0	0	0	0	126
Lane Group Flow (vph)	221	63	0	219	1209	55	992	82
Confl. Peds. (#/hr)		24		9				9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	14.3	14.5		12.1	26.5	2.8	17.2	17.2
Effective Green, g (s)	14.3	14.5		12.1	26.5	2.8	17.2	17.2
Actuated g/C Ratio	0.25	0.25		0.21	0.47	0.05	0.30	0.30
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	449	397		379	2345	86	1522	467
v/s Ratio Prot	c0.12			0.12	c0.24	0.03	c0.20	
v/s Ratio Perm		0.04						0.05
v/c Ratio	0.49	0.16		0.58	0.52	0.64	0.65	0.17
Uniform Delay, d1	18.2	16.5		20.1	10.7	26.6	17.2	14.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.2		2.1	0.2	14.6	1.0	0.2
Delay (s)	19.0	16.7		22.2	10.8	41.1	18.3	14.8
Level of Service	B	B		C	B	D	B	B
Approach Delay (s)	17.8				12.6		18.7	
Approach LOS	B				B		B	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	13.3
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	100	0	0	85	25	59	1209	30	20	39	1052	11
Future Vol, veh/h	0	0	100	0	0	85	25	59	1209	30	20	39	1052	11
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	112	0	0	96	28	66	1358	34	22	44	1182	12

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	603	-	-	709	872	1200	0	0	1016	1403	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	381	0	0	325	526	316	-	-	438	251	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	379	-	-	321	333	333	-	-	269	269	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.5	20.9	1.3	1.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	333	-	-	379	321	269	-	-
HCM Lane V/C Ratio	0.283	-	-	0.296	0.298	0.246	-	-
HCM Control Delay (s)	20.1	-	-	18.5	20.9	22.7	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	1.1	-	-	1.2	1.2	0.9	-	-

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	28	53
Average Queue (ft)	2	22
95th Queue (ft)	13	49
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	50	51	115	30	116
Average Queue (ft)	2	2	18	1	41
95th Queue (ft)	17	19	56	10	75
Link Distance (ft)	281	281	745	745	635
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	UL	TR	UL	TR
Maximum Queue (ft)	55	55	119	22	54	52
Average Queue (ft)	29	31	54	1	20	6
95th Queue (ft)	54	52	103	10	47	30
Link Distance (ft)	1033	1240		270		898
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			75		75	
Storage Blk Time (%)			6			
Queuing Penalty (veh)			15			

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	147	174	266	136	154	179	190	270	257	203	158
Average Queue (ft)	51	37	153	60	68	90	49	189	143	101	92
95th Queue (ft)	102	90	254	128	135	158	140	255	235	163	144
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)								0	0		
Queuing Penalty (veh)								0	0		
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)	1							37		9	7
Queuing Penalty (veh)	2							10		33	18

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	UL	TR	UL	T
Maximum Queue (ft)	53	100	120	26	31	53
Average Queue (ft)	25	42	40	1	12	2
95th Queue (ft)	49	76	84	9	34	18
Link Distance (ft)	407	1233		570		608
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			85		75	
Storage Blk Time (%)			1			
Queuing Penalty (veh)			3			

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (ft)	260	235	156	43	111	152	185	168	220	300	198	129
Average Queue (ft)	165	82	72	20	68	100	74	67	73	155	99	47
95th Queue (ft)	259	152	127	43	120	153	147	130	158	251	158	109
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	1	0	1				4	3		4		
Queuing Penalty (veh)	3	0	1				9	5		3		

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (ft)	52	274	298	157	141	127
Average Queue (ft)	22	185	88	88	83	58
95th Queue (ft)	48	269	186	141	135	105
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		10			3	1
Queuing Penalty (veh)		17			8	2

Network Summary

Network wide Queuing Penalty: 129

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	25
95th Queue (ft)	45
Link Distance (ft)	901
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Glenn Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	28	72
Average Queue (ft)	6	44
95th Queue (ft)	24	71
Link Distance (ft)	745	635
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	NB	SB
Directions Served	R	R	UL	T	UL
Maximum Queue (ft)	199	55	114	144	31
Average Queue (ft)	87	29	72	29	12
95th Queue (ft)	187	58	132	124	36
Link Distance (ft)	1033	1240		270	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			75		75
Storage Blk Time (%)			23		
Queuing Penalty (veh)			104		

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	130	84	118	264	244	226	72	242	157	123	78
Average Queue (ft)	107	50	95	146	159	159	39	168	136	79	62
95th Queue (ft)	150	87	133	287	266	235	66	239	167	128	94
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)	12							34		3	
Queuing Penalty (veh)	28							18		6	

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	SB
Directions Served	R	R	UL	UL
Maximum Queue (ft)	31	75	52	30
Average Queue (ft)	31	40	28	29
95th Queue (ft)	31	69	55	30
Link Distance (ft)	407	1233		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			85	75
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (ft)	182	64	43	16	69	128	84	63	86	194	213	134
Average Queue (ft)	152	44	25	11	58	111	48	39	55	144	154	108
95th Queue (ft)	180	65	52	20	72	137	87	65	81	209	237	164
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)							0			2		
Queuing Penalty (veh)							0			2		

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (ft)	19	188	115	135	111	91
Average Queue (ft)	15	152	77	89	72	56
95th Queue (ft)	27	191	133	135	107	85
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		0			1	0
Queuing Penalty (veh)		0			3	0

Network Summary

Network wide Queuing Penalty: 160

Appendix G: Existing plus Project Traffic Conditions - No Parking Structure Access to Cambridge Avenue

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	914	43	8	514	23	13
Future Vol, veh/h	914	43	8	514	23	13
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1115	52	10	627	28	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1172	0	1480	589
Stage 1	-	-	-	-	1146	-
Stage 2	-	-	-	-	334	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	597	-	117	454
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	700	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	594	-	113	452
Mov Cap-2 Maneuver	-	-	-	-	113	-
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	682	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	37.2
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	155	-	-	594	-
HCM Lane V/C Ratio	0.283	-	-	0.016	-
HCM Control Delay (s)	37.2	-	-	11.2	0.1
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	2.2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱			↰↑	Y	
Traffic Vol, veh/h	878	49	23	489	34	55
Future Vol, veh/h	878	49	23	489	34	55
Conflicting Peds, #/hr	0	4	4	0	4	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1021	57	27	569	40	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1082	0	1397	547
Stage 1	-	-	-	-	1054	-
Stage 2	-	-	-	-	343	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	646	-	133	484
Stage 1	-	-	-	-	299	-
Stage 2	-	-	-	-	693	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	644	-	124	480
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	298	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	33.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	229	-	-	644	-
HCM Lane V/C Ratio	0.452	-	-	0.042	-
HCM Control Delay (s)	33.1	-	-	10.8	0.3
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	2.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	16	0	31	7	2	50	9	49	726	35	7	57	1113	61
Future Vol, veh/h	16	0	31	7	2	50	9	49	726	35	7	57	1113	61
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	19	0	37	8	2	60	11	58	864	42	8	68	1325	73

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2008	2571	707	1710	2586	459	1020	1406	0	0	661	911	0	0
Stage 1	1522	1522	-	1028	1028	-	-	-	-	-	-	-	-	-
Stage 2	486	1049	-	682	1558	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	64	26	326	97	25	472	436	250	-	-	686	435	-	-
Stage 1	86	181	-	192	312	-	-	-	-	-	-	-	-	-
Stage 2	488	305	-	371	174	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	34	16	324	60	15	469	263	263	-	-	447	447	-	-
Mov Cap-2 Maneuver	34	16	-	60	15	-	-	-	-	-	-	-	-	-
Stage 1	63	149	-	141	229	-	-	-	-	-	-	-	-	-
Stage 2	311	224	-	273	143	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	111.2	42.1	1.7	0.8
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	263	-	-	83	165	447	-	-
HCM Lane V/C Ratio	0.263	-	-	0.674	0.426	0.17	-	-
HCM Control Delay (s)	23.5	-	-	111.2	42.1	14.7	-	-
HCM Lane LOS	C	-	-	F	E	B	-	-
HCM 95th %tile Q(veh)	1	-	-	3.2	1.9	0.6	-	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	104	122	341	599	769	390
Future Volume (vph)	104	122	341	599	769	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0	4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.94	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1505	1787	5036	5036	1546
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1505	1787	5036	5036	1546
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	135	158	443	778	999	506
RTOR Reduction (vph)	0	128	0	0	0	251
Lane Group Flow (vph)	135	30	443	778	999	255
Confl. Peds. (#/hr)		79	7			7
Heavy Vehicles (%)	1%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.9	13.1	22.7	46.7	19.8	19.8
Effective Green, g (s)	12.9	13.1	22.7	46.7	19.8	19.8
Actuated g/C Ratio	0.19	0.19	0.33	0.68	0.29	0.29
Clearance Time (s)	4.2	4.0	4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	335	286	590	3423	1451	445
v/s Ratio Prot	c0.08		c0.25	0.15	c0.20	
v/s Ratio Perm		0.02				0.16
v/c Ratio	0.40	0.11	0.75	0.23	0.69	0.57
Uniform Delay, d1	24.5	23.0	20.5	4.2	21.7	20.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2	5.4	0.0	1.4	1.8
Delay (s)	25.3	23.1	25.8	4.2	23.1	22.6
Level of Service	C	C	C	A	C	C
Approach Delay (s)	24.1			12.0	22.9	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	68.7	Sum of lost time (s)	13.3
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	16.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	4	1	47	5	11	46	22	117	955	35	3	24	885	29
Future Vol, veh/h	4	1	47	5	11	46	22	117	955	35	3	24	885	29
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	5	1	57	6	13	55	27	141	1151	42	4	29	1066	35

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1966	2694	566	2005	2690	599	804	1114	0	0	871	1195	0	0
Stage 1	1163	1163	-	1510	1510	-	-	-	-	-	-	-	-	-
Stage 2	803	1531	-	495	1180	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	67	22	402	64	22	383	573	347	-	-	527	317	-	-
Stage 1	154	269	-	88	183	-	-	-	-	-	-	-	-	-
Stage 2	313	179	-	482	264	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	10	396	30	~ 10	382	361	361	-	-	328	328	-	-
Mov Cap-2 Maneuver	-	10	-	30	~ 10	-	-	-	-	-	-	-	-	-
Stage 1	82	239	-	47	98	-	-	-	-	-	-	-	-	-
Stage 2	124	96	-	369	234	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		$ 519.5	2.9	0.5
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	361	-	-	-	45	328	-	-
HCM Lane V/C Ratio	0.464	-	-	-	1.66	0.099	-	-
HCM Control Delay (s)	23.3	-	-	-	$ 519.5	17.2	-	-
HCM Lane LOS	C	-	-	-	F	C	-	-
HCM 95th %tile Q(veh)	2.4	-	-	-	7.5	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	365	59	99	341	257	87	602	82	213	521	225
Future Volume (veh/h)	270	365	59	99	341	257	87	602	82	213	521	225
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	321	435	70	118	406	306	104	717	98	254	620	268
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	331	1255	559	149	866	386	132	1038	322	275	1486	460
Arrive On Green	0.19	0.36	0.36	0.08	0.25	0.25	0.07	0.20	0.20	0.16	0.29	0.29
Sat Flow, veh/h	1767	3526	1569	1767	3526	1572	1767	5066	1572	1767	5066	1568
Grp Volume(v), veh/h	321	435	70	118	406	306	104	717	98	254	620	268
Grp Sat Flow(s),veh/h/ln	1767	1763	1569	1767	1763	1572	1767	1689	1572	1767	1689	1568
Q Serve(g_s), s	17.1	8.6	2.9	6.2	9.3	17.3	5.5	12.5	3.9	13.5	9.4	8.2
Cycle Q Clear(g_c), s	17.1	8.6	2.9	6.2	9.3	17.3	5.5	12.5	3.9	13.5	9.4	8.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	1255	559	149	866	386	132	1038	322	275	1486	460
V/C Ratio(X)	0.97	0.35	0.13	0.79	0.47	0.79	0.79	0.69	0.30	0.92	0.42	0.58
Avail Cap(c_a), veh/h	331	1488	662	292	1410	629	255	1664	516	275	1722	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	22.5	20.6	42.7	30.6	33.6	43.2	35.0	19.2	39.5	27.0	9.9
Incr Delay (d2), s/veh	41.1	0.2	0.1	9.1	0.4	3.7	9.8	0.8	0.5	34.4	0.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.9	3.4	1.0	3.0	3.8	6.7	2.7	5.0	1.9	8.2	3.6	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.5	22.6	20.7	51.8	31.0	37.3	53.0	35.8	19.7	74.0	27.2	11.1
LnGrp LOS	E	C	C	D	C	D	D	D	B	E	C	B
Approach Vol, veh/h		826			830			919			1142	
Approach Delay, s/veh		44.6			36.3			36.0			33.8	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.7	24.4	12.2	38.7	11.3	32.8	22.7	28.2
Change Period (Y+Rc), s	4.9	* 4.9	* 4.2	4.9	* 4.2	4.9	4.9	* 4.9
Max Green Setting (Gmax), s	14.8	* 31	* 16	40.1	* 14	32.3	17.8	* 38
Max Q Clear Time (g_c+I1), s	15.5	14.5	8.2	10.6	7.5	11.4	19.1	19.3
Green Ext Time (p_c), s	0.0	4.6	0.1	3.1	0.1	4.9	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	37.3
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	692	32	11	873	32	15
Future Vol, veh/h	692	32	11	873	32	15
Conflicting Peds, #/hr	0	7	7	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	706	33	11	891	33	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	746	0	1198	377
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	468	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	865	-	180	624
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	599	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	859	-	174	620
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	584	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	25.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	226	-	-	859	-
HCM Lane V/C Ratio	0.212	-	-	0.013	-
HCM Control Delay (s)	25.2	-	-	9.2	0.1
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	670	37	30	843	42	57
Future Vol, veh/h	670	37	30	843	42	57
Conflicting Peds, #/hr	0	4	2	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	744	41	33	937	47	63

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	789	0	1306	399
Stage 1	-	-	-	-	769	-
Stage 2	-	-	-	-	537	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	833	-	153	603
Stage 1	-	-	-	-	420	-
Stage 2	-	-	-	-	553	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	830	-	140	600
Mov Cap-2 Maneuver	-	-	-	-	140	-
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	506	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	30.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	251	-	-	830	-
HCM Lane V/C Ratio	0.438	-	-	0.04	-
HCM Control Delay (s)	30.1	-	-	9.5	0.4
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	29	4	64	9	3	35	12	12	1294	13	7	21	960	21
Future Vol, veh/h	29	4	64	9	3	35	12	12	1294	13	7	21	960	21
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	31	4	69	10	3	38	13	13	1391	14	8	23	1032	23

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1725	2590	538	1946	2594	721	770	1064	0	0	1026	1423	0	0
Stage 1	1115	1115	-	1468	1468	-	-	-	-	-	-	-	-	-
Stage 2	610	1475	-	478	1126	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	95	25	420	69	25	319	598	367	-	-	433	246	-	-
Stage 1	167	284	-	94	192	-	-	-	-	-	-	-	-	-
Stage 2	411	191	-	493	280	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	64	20	416	41	20	314	423	423	-	-	267	267	-	-
Mov Cap-2 Maneuver	64	20	-	41	20	-	-	-	-	-	-	-	-	-
Stage 1	155	250	-	87	177	-	-	-	-	-	-	-	-	-
Stage 2	333	176	-	359	246	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	117.8	75.6	0.3	0.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	423	-	-	120	98	267	-	-
HCM Lane V/C Ratio	0.061	-	-	0.869	0.516	0.113	-	-
HCM Control Delay (s)	14.1	-	-	117.8	75.6	20.2	-	-
HCM Lane LOS	B	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	0.2	-	-	5.3	2.3	0.4	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	229	254	4	227	1100	924	229
Future Volume (vph)	229	254	4	227	1100	924	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1560		1787	5036	5036	1544
Flt Permitted	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1560		1787	5036	5036	1544
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	241	267	4	239	1158	973	241
RTOR Reduction (vph)	0	197	0	0	0	0	139
Lane Group Flow (vph)	241	70	0	243	1158	973	102
Confl. Peds. (#/hr)		24		9			9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	NA	Perm
Protected Phases	7		5	5	2	6	
Permitted Phases		4					6
Actuated Green, G (s)	15.3	15.5		12.7	35.0	18.1	18.1
Effective Green, g (s)	15.3	15.5		12.7	35.0	18.1	18.1
Actuated g/C Ratio	0.26	0.26		0.21	0.59	0.30	0.30
Clearance Time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	460	407		382	2967	1534	470
v/s Ratio Prot	c0.13			c0.14	0.23	c0.19	
v/s Ratio Perm		0.04					0.07
v/c Ratio	0.52	0.17		0.64	0.39	0.63	0.22
Uniform Delay, d1	18.9	17.0		21.2	6.5	17.8	15.4
Progression Factor	1.00	1.00		0.99	0.99	1.00	1.00
Incremental Delay, d2	1.1	0.2		3.5	0.1	0.9	0.2
Delay (s)	20.0	17.2		24.6	6.5	18.7	15.6
Level of Service	C	B		C	A	B	B
Approach Delay (s)	18.5				9.7	18.1	
Approach LOS	B				A	B	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	13.3
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection														
Int Delay, s/veh	25													

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	5	2	93	22	4	59	25	59	1204	28	20	39	1030	11
Future Vol, veh/h	5	2	93	22	4	59	25	59	1204	28	20	39	1030	11
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	6	2	104	25	4	66	28	66	1353	31	22	44	1157	12

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2034	2884	591	2164	2875	705	854	1175	0	0	1011	1395	0	0
Stage 1	1301	1301	-	1568	1568	-	-	-	-	-	-	-	-	-
Stage 2	733	1583	-	596	1307	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	61	16	388	51	16	327	538	325	-	-	441	253	-	-
Stage 1	124	231	-	80	172	-	-	-	-	-	-	-	-	-
Stage 2	346	169	-	419	230	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	20	9	386	~ 20	9	323	344	344	-	-	279	279	-	-
Mov Cap-2 Maneuver	20	9	-	~ 20	9	-	-	-	-	-	-	-	-	-
Stage 1	90	175	-	58	124	-	-	-	-	-	-	-	-	-
Stage 2	192	122	-	230	174	-	-	-	-	-	-	-	-	-

Approach	EB			WB			NB				SB			
HCM Control Delay, s	92.4			$ 623.7			1.2				1.2			
HCM LOS	F			F										

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	344	-	-	140	49	279	-	-
HCM Lane V/C Ratio	0.274	-	-	0.803	1.949	0.238	-	-
HCM Control Delay (s)	19.4	-	-	92.4	$ 623.7	21.9	-	-
HCM Lane LOS	C	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	1.1	-	-	5	9.6	0.9	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	241	249	28	101	361	232	80	843	88	250	680	240
Future Volume (veh/h)	241	249	28	101	361	232	80	843	88	250	680	240
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	262	271	30	110	392	252	87	916	96	272	739	261
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	287	1037	463	139	727	324	112	1286	396	303	1856	573
Arrive On Green	0.16	0.29	0.29	0.08	0.21	0.21	0.06	0.25	0.25	0.17	0.37	0.37
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1767	5066	1559	1767	5066	1563
Grp Volume(v), veh/h	262	271	30	110	392	252	87	916	96	272	739	261
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1767	1689	1559	1767	1689	1563
Q Serve(g_s), s	13.9	5.6	1.3	5.8	9.5	14.4	4.6	15.7	3.6	14.4	10.3	7.0
Cycle Q Clear(g_c), s	13.9	5.6	1.3	5.8	9.5	14.4	4.6	15.7	3.6	14.4	10.3	7.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	287	1037	463	139	727	324	112	1286	396	303	1856	573
V/C Ratio(X)	0.91	0.26	0.06	0.79	0.54	0.78	0.78	0.71	0.24	0.90	0.40	0.46
Avail Cap(c_a), veh/h	287	1420	634	280	1406	627	234	1658	510	306	1865	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	25.7	24.2	43.1	33.8	35.8	44.0	32.4	16.4	38.6	22.4	7.8
Incr Delay (d2), s/veh	31.2	0.1	0.1	9.5	0.6	4.0	11.0	1.0	0.3	26.9	0.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.3	2.3	0.5	2.8	4.0	5.7	2.3	6.2	1.7	8.2	3.9	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	25.9	24.3	52.6	34.4	39.8	55.0	33.4	16.7	65.6	22.5	8.3
LnGrp LOS	E	C	C	D	C	D	D	C	B	E	C	A
Approach Vol, veh/h		563			754			1099			1272	
Approach Delay, s/veh		46.5			38.9			33.7			28.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.3	29.1	12.0	32.9	10.5	39.8	20.4	24.6
Change Period (Y+Rc), s	4.9	* 4.9	4.5	4.9	4.5	4.9	4.9	* 4.9
Max Green Setting (Gmax), s	16.5	* 31	15.1	38.4	12.6	35.1	15.5	* 38
Max Q Clear Time (g_c+I1), s	16.4	17.7	7.8	7.6	6.6	12.3	15.9	16.4
Green Ext Time (p_c), s	0.0	5.3	0.1	1.8	0.1	6.0	0.0	3.2

Intersection Summary	
HCM 6th Ctrl Delay	35.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	47	0	0	59	9	49	742	35	7	57	1120	63
Future Vol, veh/h	0	0	47	0	0	59	9	49	742	35	7	57	1120	63
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	56	0	0	70	11	58	883	42	8	68	1333	75

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	712	-	-	469	1028	1416	0	0	675	930	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	323	0	0	465	431	248	-	-	674	426	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	321	-	-	462	259	259	-	-	437	437	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.6	14.2	1.7	0.8
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	259	-	-	321	462	437	-	-
HCM Lane V/C Ratio	0.267	-	-	0.174	0.152	0.174	-	-
HCM Control Delay (s)	23.8	-	-	18.6	14.2	15	-	-
HCM Lane LOS	C	-	-	C	B	B	-	-
HCM 95th %tile Q(veh)	1	-	-	0.6	0.5	0.6	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	104	122	5	352	599	16	769	390
Future Volume (vph)	104	122	5	352	599	16	769	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.2	4.2
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.94		1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1505		1787	5036	1752	5036	1546
Flt Permitted	0.95	1.00		0.95	1.00	0.35	1.00	1.00
Satd. Flow (perm)	1787	1505		1787	5036	637	5036	1546
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	135	158	6	457	778	21	999	506
RTOR Reduction (vph)	0	128	0	0	0	0	0	252
Lane Group Flow (vph)	135	30	0	463	778	21	999	254
Confl. Peds. (#/hr)		79		7				7
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Perm	NA	Perm
Protected Phases	7		5	5	2		6	
Permitted Phases		4				6		6
Actuated Green, G (s)	12.9	13.1		23.6	46.7	19.6	19.6	19.6
Effective Green, g (s)	12.9	13.1		23.6	46.7	19.6	19.6	19.6
Actuated g/C Ratio	0.19	0.19		0.34	0.68	0.29	0.29	0.29
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.2	4.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	335	286		613	3423	181	1436	441
v/s Ratio Prot	c0.08			c0.26	0.15		c0.20	
v/s Ratio Perm		0.02				0.03		0.16
v/c Ratio	0.40	0.11		0.76	0.23	0.12	0.70	0.58
Uniform Delay, d1	24.5	23.0		20.0	4.2	18.1	21.9	21.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2		5.3	0.0	0.3	1.5	1.8
Delay (s)	25.3	23.1		25.3	4.2	18.4	23.4	22.8
Level of Service	C	C		C	A	B	C	C
Approach Delay (s)	24.1				12.1		23.1	
Approach LOS	C				B		C	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	68.7	Sum of lost time (s)	12.6
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	52	0	0	62	22	117	959	36	3	24	890	29
Future Vol, veh/h	0	0	52	0	0	62	22	117	959	36	3	24	890	29
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	63	0	0	75	27	141	1155	43	4	29	1072	35

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	569	-	-	601	808	1120	0	0	875	1200	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	401	0	0	382	570	345	-	-	524	316	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	395	-	-	381	359	359	-	-	325	325	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.8	16.7	2.9	0.5
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	359	-	-	395	381	325	-	-
HCM Lane V/C Ratio	0.466	-	-	0.159	0.196	0.1	-	-
HCM Control Delay (s)	23.5	-	-	15.8	16.7	17.3	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	2.4	-	-	0.6	0.7	0.3	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	97	0	0	47	12	12	1323	17	7	21	969	24
Future Vol, veh/h	0	0	97	0	0	47	12	12	1323	17	7	21	969	24
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	104	0	0	51	13	13	1423	18	8	23	1042	26

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	544	-	-	739	779	1077	0	0	1052	1459	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	416	0	0	311	591	362	-	-	418	236	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	412	-	-	306	400	400	-	-	254	254	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	19.1	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	400	-	-	412	306	254	-	-
HCM Lane V/C Ratio	0.065	-	-	0.253	0.165	0.119	-	-
HCM Control Delay (s)	14.6	-	-	16.7	19.1	21.1	-	-
HCM Lane LOS	B	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	0.2	-	-	1	0.6	0.4	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	229	254	26	231	1100	33	924	229
Future Volume (vph)	229	254	26	231	1100	33	924	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1559		1784	5036	1752	5036	1542
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1559		1784	5036	1752	5036	1542
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	241	267	27	243	1158	35	973	241
RTOR Reduction (vph)	0	201	0	0	0	0	0	143
Lane Group Flow (vph)	241	66	0	270	1158	35	973	98
Confl. Peds. (#/hr)		24		9				9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	15.4	15.6		16.3	32.3	2.1	18.1	18.1
Effective Green, g (s)	15.4	15.6		16.3	32.3	2.1	18.1	18.1
Actuated g/C Ratio	0.24	0.25		0.26	0.51	0.03	0.29	0.29
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	436	385		460	2577	58	1444	442
v/s Ratio Prot	c0.13			c0.15	0.23	0.02	c0.19	
v/s Ratio Perm		0.04						0.06
v/c Ratio	0.55	0.17		0.59	0.45	0.60	0.67	0.22
Uniform Delay, d1	20.8	18.7		20.5	9.8	30.1	19.9	17.1
Progression Factor	1.00	1.00		0.99	0.99	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.2		1.9	0.1	16.4	1.3	0.3
Delay (s)	22.4	18.9		22.3	9.8	46.5	21.1	17.4
Level of Service	C	B		C	A	D	C	B
Approach Delay (s)	20.5				12.2		21.1	
Approach LOS	C				B		C	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	13.3
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	100	0	0	85	25	59	1209	30	20	39	1052	11
Future Vol, veh/h	0	0	100	0	0	85	25	59	1209	30	20	39	1052	11
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	112	0	0	96	28	66	1358	34	22	44	1182	12

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	603	-	-	709	872	1200	0	0	1016	1403	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	381	0	0	325	526	316	-	-	438	251	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	379	-	-	321	333	333	-	-	269	269	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.5	20.9	1.3	1.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	333	-	-	379	321	269	-	-
HCM Lane V/C Ratio	0.283	-	-	0.296	0.298	0.246	-	-
HCM Control Delay (s)	20.1	-	-	18.5	20.9	22.7	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	1.1	-	-	1.2	1.2	0.9	-	-

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	31	31
Average Queue (ft)	4	21
95th Queue (ft)	21	44
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	EB	EB	WB	NB
Directions Served	T	TR	LT	LR
Maximum Queue (ft)	29	31	110	116
Average Queue (ft)	1	1	14	43
95th Queue (ft)	10	10	54	90
Link Distance (ft)	281	281	745	635
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	UL	T	UL	T	TR
Maximum Queue (ft)	95	55	81	31	53	121	74
Average Queue (ft)	34	32	29	1	21	5	2
95th Queue (ft)	70	55	65	10	48	42	24
Link Distance (ft)	1033	1240		270		898	898
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		75		
Storage Blk Time (%)			2			1	
Queuing Penalty (veh)			5			0	

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	121	88	346	169	191	202	53	272	270	212	216
Average Queue (ft)	61	30	206	49	64	83	20	176	132	113	116
95th Queue (ft)	102	62	319	122	132	157	49	256	223	189	197
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)								0	0		
Queuing Penalty (veh)								2	0		
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)	2	0						37		11	18
Queuing Penalty (veh)	2	0						6		44	45

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	UL	T	TR	UL	TR
Maximum Queue (ft)	55	56	114	31	27	47	22
Average Queue (ft)	26	35	42	1	1	16	1
95th Queue (ft)	50	56	88	10	9	42	7
Link Distance (ft)	407	1233		570	570		608
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			85			75	
Storage Blk Time (%)			1				
Queuing Penalty (veh)			4				

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (ft)	339	450	373	43	150	178	177	167	172	259	224	231
Average Queue (ft)	197	116	102	19	70	116	87	77	56	155	109	54
95th Queue (ft)	319	273	225	42	123	174	161	141	118	227	189	150
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	13	0	0				3	5	0	3		1
Queuing Penalty (veh)	24	0	0				9	9	0	3		0

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (ft)	224	273	172	191	152	154
Average Queue (ft)	27	163	82	102	84	67
95th Queue (ft)	91	261	151	159	138	124
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		5			4	2
Queuing Penalty (veh)		9			10	3

Network Summary

Network wide Queuing Penalty: 174

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	76	55
Average Queue (ft)	10	28
95th Queue (ft)	48	55
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	EB	WB	WB	NB
Directions Served	T	LT	T	LR
Maximum Queue (ft)	31	197	200	94
Average Queue (ft)	3	34	7	44
95th Queue (ft)	18	115	66	80
Link Distance (ft)	281	745	745	635
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	SB	SB
Directions Served	R	R	UL	UL	T
Maximum Queue (ft)	162	74	56	32	89
Average Queue (ft)	47	34	21	17	3
95th Queue (ft)	104	60	49	40	29
Link Distance (ft)	1033	1240			898
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			75	75	
Storage Blk Time (%)			0		0
Queuing Penalty (veh)			0		0

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	171	196	315	181	222	332	186	287	236	202	142
Average Queue (ft)	98	73	156	89	118	123	42	182	136	101	64
95th Queue (ft)	164	149	281	167	206	222	113	274	224	174	108
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)								0			
Queuing Penalty (veh)								2			
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)	6	1						32		8	1
Queuing Penalty (veh)	15	2						11		19	3

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	R	UL	T	T	TR	UL	T	T	TR
Maximum Queue (ft)	97	55	76	94	74	126	59	92	52	31
Average Queue (ft)	46	36	37	5	2	6	27	3	3	1
95th Queue (ft)	74	58	69	36	25	44	58	30	21	10
Link Distance (ft)	407	1233		570	570	570		608	608	608
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			85				75			
Storage Blk Time (%)			0	0			1	0		
Queuing Penalty (veh)			0	0			2	0		

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (ft)	340	480	392	58	193	174	139	125	219	305	253	186
Average Queue (ft)	210	123	73	10	89	112	73	60	65	159	157	115
95th Queue (ft)	353	356	216	32	159	160	126	109	133	237	224	188
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	16						4	2		3		1
Queuing Penalty (veh)	20						9	4		2		1

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (ft)	43	280	502	316	217	172
Average Queue (ft)	19	206	165	140	136	68
95th Queue (ft)	37	308	388	231	198	121
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		28			17	1
Queuing Penalty (veh)		63			41	2

Network Summary

Network wide Queuing Penalty: 197

Appendix H: Near Term plus Project Traffic Conditions

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	926	43	8	529	23	13
Future Vol, veh/h	926	43	8	529	23	13
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1129	52	10	645	28	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1186	0	1503	596
Stage 1	-	-	-	-	1160	-
Stage 2	-	-	-	-	343	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	590	-	113	449
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	693	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	587	-	109	447
Mov Cap-2 Maneuver	-	-	-	-	109	-
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	674	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	38.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	150	-	-	587	-
HCM Lane V/C Ratio	0.293	-	-	0.017	-
HCM Control Delay (s)	38.6	-	-	11.2	0.1
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	2.3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	890	49	23	504	34	57
Future Vol, veh/h	890	49	23	504	34	57
Conflicting Peds, #/hr	0	4	4	0	4	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1035	57	27	586	40	66

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1096	0	1419	554
Stage 1	-	-	-	-	1068	-
Stage 2	-	-	-	-	351	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	638	-	129	479
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	687	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	636	-	120	475
Mov Cap-2 Maneuver	-	-	-	-	120	-
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	641	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	34.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	226	-	-	636	-
HCM Lane V/C Ratio	0.468	-	-	0.042	-
HCM Control Delay (s)	34.2	-	-	10.9	0.3
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	2.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	47.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	28	0	43	8	2	51	9	116	790	36	7	58	1137	102
Future Vol, veh/h	28	0	43	8	2	51	9	116	790	36	7	58	1137	102
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	33	0	51	10	2	61	11	138	940	43	8	69	1354	121

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2253	2863	746	1961	2902	498	1077	1483	0	0	718	988	0	0
Stage 1	1577	1577	-	1265	1265	-	-	-	-	-	-	-	-	-
Stage 2	676	1286	-	696	1637	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	45	17	307	68	16	445	405	229	-	-	639	400	-	-
Stage 1	79	170	-	131	241	-	-	-	-	-	-	-	-	-
Stage 2	375	235	-	364	159	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	~ 11	5	305	24	5	442	233	233	-	-	411	411	-	-
Mov Cap-2 Maneuver	~ 11	5	-	24	5	-	-	-	-	-	-	-	-	-
Stage 1	~ 28	137	-	47	86	-	-	-	-	-	-	-	-	-
Stage 2	113	84	-	246	128	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 1327.5	207.6	5.8	0.8
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	233	-	-	26	72	411	-	-
HCM Lane V/C Ratio	0.639	-	-	3.251	1.009	0.188	-	-
HCM Control Delay (s)	44.3	-	-	$ 1327.5	207.6	15.8	-	-
HCM Lane LOS	E	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	3.9	-	-	10.4	5.3	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	95	128	275	740	845	351
Future Volume (vph)	95	128	275	740	845	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0	4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.94	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1508	1787	5036	5036	1547
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1508	1787	5036	5036	1547
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	123	166	357	961	1097	456
RTOR Reduction (vph)	0	134	0	0	0	202
Lane Group Flow (vph)	123	32	357	961	1097	254
Confl. Peds. (#/hr)		79	7			7
Heavy Vehicles (%)	1%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.5	12.7	18.6	44.5	21.7	21.7
Effective Green, g (s)	12.5	12.7	18.6	44.5	21.7	21.7
Actuated g/C Ratio	0.19	0.19	0.28	0.67	0.33	0.33
Clearance Time (s)	4.2	4.0	4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	337	289	502	3390	1653	507
v/s Ratio Prot	c0.07		c0.20	0.19	c0.22	
v/s Ratio Perm		0.02				0.16
v/c Ratio	0.36	0.11	0.71	0.28	0.66	0.50
Uniform Delay, d1	23.3	22.0	21.3	4.4	19.1	17.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2	4.7	0.0	1.0	0.8
Delay (s)	24.0	22.2	26.1	4.4	20.1	18.6
Level of Service	C	C	C	A	C	B
Approach Delay (s)	23.0			10.3	19.7	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	13.3
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	26.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	5	1	48	6	11	47	22	117	1028	36	3	25	948	30
Future Vol, veh/h	5	1	48	6	11	47	22	117	1028	36	3	25	948	30
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	6	1	58	7	13	57	27	141	1239	43	4	30	1142	36

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2079	2861	604	2126	2858	643	860	1191	0	0	936	1284	0	0
Stage 1	1241	1241	-	1599	1599	-	-	-	-	-	-	-	-	-
Stage 2	838	1620	-	527	1259	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	57	17	380	54	17	359	534	319	-	-	485	287	-	-
Stage 1	136	247	-	76	166	-	-	-	-	-	-	-	-	-
Stage 2	298	162	-	461	242	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	7	375	22	~ 7	358	332	332	-	-	296	296	-	-
Mov Cap-2 Maneuver	-	7	-	22	~ 7	-	-	-	-	-	-	-	-	-
Stage 1	67	216	-	38	82	-	-	-	-	-	-	-	-	-
Stage 2	105	80	-	343	212	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		$ 906.5	3	0.5
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	332	-	-	-	32	296	-	-
HCM Lane V/C Ratio	0.504	-	-	-	2.41	0.114	-	-
HCM Control Delay (s)	26.4	-	-	-	$ 906.5	18.7	-	-
HCM Lane LOS	D	-	-	-	F	C	-	-
HCM 95th %tile Q(veh)	2.7	-	-	-	8.9	0.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	5	306	370	61	102	341	273	5	87	624	82	229
Future Volume (vph)	5	306	370	61	102	341	273	5	87	624	82	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1752	3505	1546	1752	3505	1568		1752	5036	1568	1752
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1752	3505	1546	1752	3505	1568		1752	5036	1568	1752
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	6	364	440	73	121	406	325	6	104	743	98	273
RTOR Reduction (vph)	0	0	0	51	0	0	214	0	0	0	76	0
Lane Group Flow (vph)	0	370	440	22	121	406	111	0	110	743	22	273
Confl. Peds. (#/hr)				3								3
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		19.2	27.1	27.1	11.5	19.4	19.4		10.1	20.8	20.8	14.1
Effective Green, g (s)		19.2	27.1	27.1	11.5	19.4	19.4		10.1	20.8	20.8	14.1
Actuated g/C Ratio		0.21	0.30	0.30	0.13	0.21	0.21		0.11	0.23	0.23	0.15
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		366	1035	456	219	741	331		192	1142	355	269
v/s Ratio Prot		c0.21	0.13		0.07	c0.12			0.06	c0.15		c0.16
v/s Ratio Perm				0.01			0.07				0.01	
v/c Ratio		1.01	0.43	0.05	0.55	0.55	0.34		0.57	0.65	0.06	1.01
Uniform Delay, d1		36.2	26.0	23.1	37.7	32.2	30.7		38.8	32.2	27.8	38.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.99
Incremental Delay, d2		49.8	0.3	0.0	3.0	0.8	0.6		4.1	1.3	0.1	58.7
Delay (s)		86.1	26.3	23.1	40.7	33.1	31.3		42.8	33.5	27.9	97.3
Level of Service		F	C	C	D	C	C		D	C	C	F
Approach Delay (s)			51.1			33.5				34.0		
Approach LOS			D			C				C		

Intersection Summary			
HCM 2000 Control Delay	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	18.2
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	554	241
Future Volume (vph)	554	241
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	4.9
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	1.00
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1568
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1568
Peak-hour factor, PHF	0.84	0.84
Adj. Flow (vph)	660	287
RTOR Reduction (vph)	0	188
Lane Group Flow (vph)	660	99
Confl. Peds. (#/hr)		
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	24.8	24.8
Effective Green, g (s)	24.8	24.8
Actuated g/C Ratio	0.27	0.27
Clearance Time (s)	4.9	4.9
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	1361	424
v/s Ratio Prot	0.13	
v/s Ratio Perm		0.06
v/c Ratio	0.48	0.23
Uniform Delay, d1	28.1	26.0
Progression Factor	0.99	0.96
Incremental Delay, d2	0.3	0.3
Delay (s)	28.1	25.3
Level of Service	C	C
Approach Delay (s)	42.9	
Approach LOS	D	

Intersection Summary

Intersection						
Int Delay, s/veh	0.8					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	700	32	11	883	32	15
Future Vol, veh/h	700	32	11	883	32	15
Conflicting Peds, #/hr	0	7	7	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	714	33	11	901	33	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	754	0	1211	381
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	473	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	859	-	176	620
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	596	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	853	-	170	616
Mov Cap-2 Maneuver	-	-	-	-	170	-
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	581	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	25.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	221	-	-	853	-
HCM Lane V/C Ratio	0.217	-	-	0.013	-
HCM Control Delay (s)	25.7	-	-	9.3	0.1
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	678	37	30	853	42	58
Future Vol, veh/h	678	37	30	853	42	58
Conflicting Peds, #/hr	0	4	2	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	753	41	33	948	47	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	798	0	1320	403
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	542	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	827	-	150	600
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	550	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	824	-	137	597
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	502	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	30.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	248	-	-	824	-
HCM Lane V/C Ratio	0.448	-	-	0.04	-
HCM Control Delay (s)	30.8	-	-	9.6	0.4
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	29.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	48	4	83	10	3	36	12	62	1324	14	7	22	978	52
Future Vol, veh/h	48	4	83	10	3	36	12	62	1324	14	7	22	978	52
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	52	4	89	11	3	39	13	67	1424	15	8	24	1052	56

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1884	2770	564	2098	2791	738	808	1117	0	0	1050	1457	0	0
Stage 1	1153	1153	-	1610	1610	-	-	-	-	-	-	-	-	-
Stage 2	731	1617	-	488	1181	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	76	19	404	56	19	311	570	346	-	-	420	236	-	-
Stage 1	157	272	-	75	164	-	-	-	-	-	-	-	-	-
Stage 2	347	162	-	487	264	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	~ 41	13	400	24	13	306	357	357	-	-	255	255	-	-
Mov Cap-2 Maneuver	~ 41	13	-	24	13	-	-	-	-	-	-	-	-	-
Stage 1	121	237	-	57	125	-	-	-	-	-	-	-	-	-
Stage 2	229	124	-	326	230	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 498.5	171.2	0.9	0.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	357	-	-	80	64	255	-	-
HCM Lane V/C Ratio	0.223	-	-	1.815	0.823	0.122	-	-
HCM Control Delay (s)	18	-	-	$ 498.5	171.2	21.1	-	-
HCM Lane LOS	C	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	0.8	-	-	12.5	3.8	0.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	212	236	4	178	1198	992	199
Future Volume (vph)	212	236	4	178	1198	992	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1562		1786	5036	5036	1546
Flt Permitted	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1562		1786	5036	5036	1546
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	223	248	4	187	1261	1044	209
RTOR Reduction (vph)	0	182	0	0	0	0	119
Lane Group Flow (vph)	223	66	0	191	1261	1044	90
Confl. Peds. (#/hr)		24		9			9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	NA	Perm
Protected Phases	7		5	5	2	6	
Permitted Phases		4					6
Actuated Green, G (s)	14.3	14.5		9.4	31.5	17.9	17.9
Effective Green, g (s)	14.3	14.5		9.4	31.5	17.9	17.9
Actuated g/C Ratio	0.26	0.26		0.17	0.57	0.33	0.33
Clearance Time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	465	412		305	2889	1641	504
v/s Ratio Prot	c0.12			c0.11	0.25	c0.21	
v/s Ratio Perm		0.04					0.06
v/c Ratio	0.48	0.16		0.63	0.44	0.64	0.18
Uniform Delay, d1	17.2	15.5		21.1	6.7	15.7	13.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.2		4.0	0.1	0.8	0.2
Delay (s)	17.9	15.7		25.1	6.8	16.5	13.4
Level of Service	B	B		C	A	B	B
Approach Delay (s)	16.8				9.2	16.0	
Approach LOS	B				A	B	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	13.3
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection														
Int Delay, s/veh	38.6													

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	6	2	94	23	4	60	25	59	1251	29	20	40	1078	12
Future Vol, veh/h	6	2	94	23	4	60	25	59	1251	29	20	40	1078	12
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	7	2	106	26	4	67	28	66	1406	33	22	45	1211	13

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2112	2996	618	2241	2986	733	894	1230	0	0	1050	1450	0	0
Stage 1	1358	1358	-	1622	1622	-	-	-	-	-	-	-	-	-
Stage 2	754	1638	-	619	1364	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	55	14	372	45	14	313	511	305	-	-	420	238	-	-
Stage 1	113	217	-	73	161	-	-	-	-	-	-	-	-	-
Stage 2	336	158	-	406	216	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	14	7	370	~ 15	7	309	323	323	-	-	262	262	-	-
Mov Cap-2 Maneuver	14	7	-	~ 15	7	-	-	-	-	-	-	-	-	-
Stage 1	80	161	-	51	113	-	-	-	-	-	-	-	-	-
Stage 2	178	111	-	213	160	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	191.3	$ 938.1	1.3	1.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	323	-	-	105	38	262	-	-
HCM Lane V/C Ratio	0.292	-	-	1.091	2.572	0.257	-	-
HCM Control Delay (s)	20.7	-	-	191.3	$ 938.1	23.4	-	-
HCM Lane LOS	C	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	1.2	-	-	7.2	10.8	1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	6	271	254	31	109	361	239	9	80	854	88	258
Future Volume (vph)	6	271	254	31	109	361	239	9	80	854	88	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1752	3505	1568	1752	3505	1568		1752	5036	1539	1752
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1752	3505	1568	1752	3505	1568		1752	5036	1539	1752
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	295	276	34	118	392	260	10	87	928	96	280
RTOR Reduction (vph)	0	0	0	25	0	0	208	0	0	0	71	0
Lane Group Flow (vph)	0	302	276	9	118	392	52	0	97	928	25	280
Confl. Peds. (#/hr)											7	7
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		17.1	25.0	25.0	11.5	19.4	19.4		8.7	25.1	25.1	17.1
Effective Green, g (s)		17.1	25.0	25.0	11.5	19.4	19.4		8.7	25.1	25.1	17.1
Actuated g/C Ratio		0.18	0.26	0.26	0.12	0.20	0.20		0.09	0.26	0.26	0.18
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		309	904	404	207	701	313		157	1304	398	309
v/s Ratio Prot		c0.17	0.08		0.07	c0.11			0.06	c0.18		c0.16
v/s Ratio Perm				0.01			0.03				0.02	
v/c Ratio		0.98	0.31	0.02	0.57	0.56	0.17		0.62	0.71	0.06	0.91
Uniform Delay, d1		39.7	29.0	26.8	40.4	34.9	32.1		42.5	32.6	27.0	39.1
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.99
Incremental Delay, d2		44.6	0.2	0.0	3.8	1.0	0.3		7.1	1.9	0.1	28.3
Delay (s)		84.3	29.1	26.8	44.1	35.9	32.3		49.5	34.5	27.1	67.1
Level of Service		F	C	C	D	D	C		D	C	C	E
Approach Delay (s)			56.2			35.9				35.1		
Approach LOS			E			D				D		

Intersection Summary			
HCM 2000 Control Delay	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	96.9	Sum of lost time (s)	18.2
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	713	249
Future Volume (vph)	713	249
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	4.9
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	1.00
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1568
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1568
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	775	271
RTOR Reduction (vph)	0	135
Lane Group Flow (vph)	775	136
Confl. Peds. (#/hr)		
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	33.5	33.5
Effective Green, g (s)	33.5	33.5
Actuated g/C Ratio	0.35	0.35
Clearance Time (s)	4.9	4.9
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	1741	542
v/s Ratio Prot	0.15	
v/s Ratio Perm		0.09
v/c Ratio	0.45	0.25
Uniform Delay, d1	24.5	22.7
Progression Factor	0.99	0.96
Incremental Delay, d2	0.2	0.2
Delay (s)	24.4	22.1
Level of Service	C	C
Approach Delay (s)	33.0	
Approach LOS	C	

Intersection Summary

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	71	0	0	61	9	116	818	36	7	58	1145	104
Future Vol, veh/h	0	0	71	0	0	61	9	116	818	36	7	58	1145	104
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	85	0	0	73	11	138	974	43	8	69	1363	124

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	752	-	-	515	1085	1495	0	0	742	1022	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	304	0	0	434	401	226	-	-	620	385	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	302	-	-	432	228	228	-	-	395	395	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.5	15	5.9	0.8
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	228	-	-	302	432	395	-	-
HCM Lane V/C Ratio	0.653	-	-	0.28	0.168	0.196	-	-
HCM Control Delay (s)	46.1	-	-	21.5	15	16.3	-	-
HCM Lane LOS	E	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	4	-	-	1.1	0.6	0.7	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	95	128	6	286	740	28	845	351
Future Volume (vph)	95	128	6	286	740	28	845	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.91		1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1449		1786	5036	1752	5036	1530
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1449		1786	5036	1752	5036	1530
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	123	166	8	371	961	36	1097	456
RTOR Reduction (vph)	0	143	0	0	0	0	0	127
Lane Group Flow (vph)	123	23	0	379	961	36	1097	329
Confl. Peds. (#/hr)		79		7				7
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	16.6	16.8		31.2	85.4	4.7	58.9	58.9
Effective Green, g (s)	16.6	16.8		31.2	85.4	4.7	58.9	58.9
Actuated g/C Ratio	0.14	0.14		0.26	0.71	0.04	0.49	0.49
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	247	202		464	3583	68	2471	750
v/s Ratio Prot	c0.07			c0.21	0.19	0.02	c0.22	
v/s Ratio Perm		0.02						0.22
v/c Ratio	0.50	0.12		0.82	0.27	0.53	0.44	0.44
Uniform Delay, d1	47.8	45.1		41.7	6.2	56.6	19.9	19.8
Progression Factor	1.00	1.00		0.70	0.40	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.3		9.2	0.2	7.3	0.6	1.9
Delay (s)	49.4	45.4		38.4	2.6	63.8	20.5	21.7
Level of Service	D	D		D	A	E	C	C
Approach Delay (s)	47.1				12.7		21.8	
Approach LOS	D				B		C	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.3
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	54	0	0	64	22	117	1033	37	3	25	954	30
Future Vol, veh/h	0	0	54	0	0	64	22	117	1033	37	3	25	954	30
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	65	0	0	77	27	141	1245	45	4	30	1149	36

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	608	-	-	647	865	1198	0	0	941	1292	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	378	0	0	357	531	316	-	-	482	285	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	373	-	-	356	328	328	-	-	293	293	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	17.9	3.1	0.5
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	328	-	-	373	356	293	-	-
HCM Lane V/C Ratio	0.511	-	-	0.174	0.217	0.115	-	-
HCM Control Delay (s)	26.9	-	-	16.7	17.9	18.9	-	-
HCM Lane LOS	D	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	2.8	-	-	0.6	0.8	0.4	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	135	0	0	49	12	62	1372	18	7	22	988	55
Future Vol, veh/h	0	0	135	0	0	49	12	62	1372	18	7	22	988	55
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	145	0	0	53	13	67	1475	19	8	24	1062	59

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	571	-	-	765	819	1130	0	0	1091	1512	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	399	0	0	299	562	341	-	-	398	222	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	395	-	-	294	343	343	-	-	238	238	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.3	19.9	0.9	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	343	-	-	395	294	238	-	-
HCM Lane V/C Ratio	0.232	-	-	0.367	0.179	0.131	-	-
HCM Control Delay (s)	18.6	-	-	19.3	19.9	22.4	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	0.9	-	-	1.7	0.6	0.4	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	212	236	27	182	1198	52	992	199
Future Volume (vph)	212	236	27	182	1198	52	992	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1560		1783	5036	1752	5036	1543
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1560		1783	5036	1752	5036	1543
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	223	248	28	192	1261	55	1044	209
RTOR Reduction (vph)	0	187	0	0	0	0	0	113
Lane Group Flow (vph)	223	61	0	220	1261	55	1044	96
Confl. Peds. (#/hr)		24		9				9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	14.8	15.0		13.9	30.0	2.7	18.8	18.8
Effective Green, g (s)	14.8	15.0		13.9	30.0	2.7	18.8	18.8
Actuated g/C Ratio	0.24	0.25		0.23	0.49	0.04	0.31	0.31
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	434	384		407	2484	77	1557	477
v/s Ratio Prot	c0.12			0.12	c0.25	0.03	c0.21	
v/s Ratio Perm		0.04						0.06
v/c Ratio	0.51	0.16		0.54	0.51	0.71	0.67	0.20
Uniform Delay, d1	19.9	18.0		20.6	10.4	28.7	18.3	15.5
Progression Factor	1.00	1.00		1.00	0.99	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.2		1.5	0.2	26.8	1.1	0.2
Delay (s)	20.9	18.2		22.0	10.5	55.5	19.4	15.7
Level of Service	C	B		C	B	E	B	B
Approach Delay (s)	19.5				12.2		20.4	
Approach LOS	B				B		C	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	13.3
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	102	0	0	87	25	59	1257	31	20	40	1101	12
Future Vol, veh/h	0	0	102	0	0	87	25	59	1257	31	20	40	1101	12
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	115	0	0	98	28	66	1412	35	22	45	1237	13

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	631	-	-	737	913	1256	0	0	1056	1458	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	365	0	0	311	499	296	-	-	416	236	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	363	-	-	307	311	311	-	-	252	252	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.4	22.1	1.3	1.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	311	-	-	363	307	252	-	-
HCM Lane V/C Ratio	0.303	-	-	0.316	0.318	0.268	-	-
HCM Control Delay (s)	21.6	-	-	19.4	22.1	24.4	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	1.2	-	-	1.3	1.3	1	-	-

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	55	76
Average Queue (ft)	4	26
95th Queue (ft)	24	57
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	EB	EB	WB	NB
Directions Served	T	TR	LT	LR
Maximum Queue (ft)	52	50	131	95
Average Queue (ft)	4	3	21	42
95th Queue (ft)	23	20	72	74
Link Distance (ft)	281	281	745	635
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	R	R	UL	T	T	TR	UL	T	TR
Maximum Queue (ft)	91	53	175	231	28	26	53	76	55
Average Queue (ft)	43	32	82	19	1	1	21	4	8
95th Queue (ft)	70	50	154	116	9	9	48	28	29
Link Distance (ft)	1033	1240		270	270	270		898	898
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			75				75		
Storage Blk Time (%)			28					0	
Queuing Penalty (veh)			75					0	

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	112	81	415	173	233	246	190	270	230	270	250
Average Queue (ft)	62	29	193	48	56	74	43	171	142	135	103
95th Queue (ft)	109	59	306	117	140	156	131	258	225	223	202
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)								0		0	0
Queuing Penalty (veh)								1		1	0
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)	1		0				0	32		22	13
Queuing Penalty (veh)	1		1				0	9		77	36

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	UL	T	UL	TR
Maximum Queue (ft)	50	56	103	165	51	22
Average Queue (ft)	28	36	46	6	17	1
95th Queue (ft)	45	54	96	54	45	7
Link Distance (ft)	407	1233		570		608
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			85		75	
Storage Blk Time (%)			2			
Queuing Penalty (veh)			8			

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	T	T	R	UL	T	T	T
Maximum Queue (ft)	339	409	369	42	200	195	287	170	220	348	289	177
Average Queue (ft)	218	106	95	15	80	128	108	82	81	192	138	75
95th Queue (ft)	345	245	203	34	139	188	199	159	169	315	237	158
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	12	0	1				9	7		12		1
Queuing Penalty (veh)	23	0	0				24	11		11		1

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (ft)	41	280	324	155	153	161
Average Queue (ft)	20	170	101	108	89	65
95th Queue (ft)	38	256	213	163	141	116
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		4			3	1
Queuing Penalty (veh)		8			7	2

Network Summary

Network wide Queuing Penalty: 297

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	96	53
Average Queue (ft)	8	27
95th Queue (ft)	39	49
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	76	118
Average Queue (ft)	19	46
95th Queue (ft)	57	84
Link Distance (ft)	745	635
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	SB	SB
Directions Served	R	R	UL	UL	TR
Maximum Queue (ft)	160	54	96	29	22
Average Queue (ft)	57	29	38	17	1
95th Queue (ft)	112	52	77	38	10
Link Distance (ft)	1020	1240			898
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			75	75	
Storage Blk Time (%)			3		
Queuing Penalty (veh)			12		

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	164	167	198	275	266	258	74	239	262	182	162
Average Queue (ft)	88	63	108	87	112	129	33	155	121	102	56
95th Queue (ft)	150	122	177	190	213	239	68	228	215	157	108
Link Distance (ft)		842		608	608	608	267	267	267	267	
Upstream Blk Time (%)									0		
Queuing Penalty (veh)									0		
Storage Bay Dist (ft)	105		395								100
Storage Blk Time (%)	5	1								9	1
Queuing Penalty (veh)	13	1								17	3

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	UL	T	UL	TR
Maximum Queue (ft)	99	70	74	88	71	31
Average Queue (ft)	47	37	35	3	23	1
95th Queue (ft)	79	61	69	29	57	10
Link Distance (ft)	407	1233		570		608
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			85		75	
Storage Blk Time (%)			0	0	0	
Queuing Penalty (veh)			0	0	0	

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	T	T	R	UL	T	T	T
Maximum Queue (ft)	339	510	464	19	152	218	226	170	219	258	240	212
Average Queue (ft)	200	140	90	9	69	113	94	67	75	162	156	130
95th Queue (ft)	357	405	292	23	128	178	169	131	165	234	218	202
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	20						4	5		4		3
Queuing Penalty (veh)	25						9	9		4		2

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (ft)	79	279	342	240	198	145
Average Queue (ft)	22	206	117	109	108	69
95th Queue (ft)	55	310	261	182	168	130
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		21	0		11	2
Queuing Penalty (veh)		49	0		29	5

Network Summary

Network wide Queuing Penalty: 180

Appendix I: Cumulative Year 2035 No Project Traffic Conditions

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1017	25	6	627	14	11
Future Vol, veh/h	1017	25	6	627	14	11
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1105	27	7	682	15	12

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1137	0	1479	571
Stage 1	-	-	-	-	1124	-
Stage 2	-	-	-	-	355	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	616	-	118	466
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	684	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	613	-	115	464
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	672	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	29.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	172	-	-	613	-
HCM Lane V/C Ratio	0.158	-	-	0.011	-
HCM Control Delay (s)	29.8	-	-	10.9	0.1
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection						
Int Delay, s/veh	1.6					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1018	25	6	605	30	52
Future Vol, veh/h	1018	25	6	605	30	52
Conflicting Peds, #/hr	0	4	4	0	4	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1107	27	7	658	33	57

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1138	0	1472	575
Stage 1	-	-	-	-	1125	-
Stage 2	-	-	-	-	347	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	615	-	119	464
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	690	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	613	-	116	460
Mov Cap-2 Maneuver	-	-	-	-	116	-
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	675	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	31.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	221	-	-	613	-
HCM Lane V/C Ratio	0.403	-	-	0.011	-
HCM Control Delay (s)	31.9	-	-	10.9	0.1
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	1.8	-	-	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	6	0	22	10	1	62	9	49	1056	54	7	69	1247	38
Future Vol, veh/h	6	0	22	10	1	62	9	49	1056	54	7	69	1247	38
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	7	0	24	11	1	67	10	53	1148	59	8	75	1355	41

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2137	2888	706	2017	2879	610	1020	1404	0	0	881	1212	0	0
Stage 1	1550	1550	-	1309	1309	-	-	-	-	-	-	-	-	-
Stage 2	587	1338	-	708	1570	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	53	16	326	63	16	377	436	251	-	-	520	311	-	-
Stage 1	82	175	-	122	229	-	-	-	-	-	-	-	-	-
Stage 2	424	222	-	358	171	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	26	9	324	38	9	375	265	265	-	-	318	318	-	-
Mov Cap-2 Maneuver	26	9	-	38	9	-	-	-	-	-	-	-	-	-
Stage 1	62	128	-	93	174	-	-	-	-	-	-	-	-	-
Stage 2	263	168	-	245	125	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60.6	64	1.1	1.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	265	-	-	94	135	318	-	-
HCM Lane V/C Ratio	0.238	-	-	0.324	0.588	0.26	-	-
HCM Control Delay (s)	22.8	-	-	60.6	64	20.2	-	-
HCM Lane LOS	C	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	0.9	-	-	1.2	3	1	-	-

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	77	77	106	930	971	293
Future Volume (vph)	77	77	106	930	971	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0	4.2	4.9	4.2	4.2
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.95	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1515	1787	5036	5036	1549
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1515	1787	5036	5036	1549
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	84	115	1011	1055	318
RTOR Reduction (vph)	0	70	0	0	0	108
Lane Group Flow (vph)	84	14	115	1011	1055	210
Confl. Peds. (#/hr)		79	7			7
Heavy Vehicles (%)	1%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	9.4	9.6	8.1	41.1	29.5	29.5
Effective Green, g (s)	9.4	9.6	8.1	41.1	29.5	29.5
Actuated g/C Ratio	0.16	0.16	0.14	0.69	0.49	0.49
Clearance Time (s)	4.2	4.0	4.2	4.9	4.2	4.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	244	242	3472	2492	766
v/s Ratio Prot	c0.05		c0.06	0.20	c0.21	
v/s Ratio Perm		0.01				0.14
v/c Ratio	0.30	0.06	0.48	0.29	0.42	0.27
Uniform Delay, d1	22.2	21.2	23.8	3.6	9.6	8.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	1.5	0.0	0.1	0.2
Delay (s)	22.8	21.3	25.3	3.6	9.7	9.0
Level of Service	C	C	C	A	A	A
Approach Delay (s)	22.0			5.8	9.6	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	12.6
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	9.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	2	2	76	6	11	46	22	106	961	51	3	25	1004	31
Future Vol, veh/h	2	2	76	6	11	46	22	106	961	51	3	25	1004	31
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	2	2	83	7	12	50	24	115	1045	55	3	27	1091	34

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1883	2561	578	1852	2551	552	821	1138	0	0	803	1102	0	0
Stage 1	1181	1181	-	1353	1353	-	-	-	-	-	-	-	-	-
Stage 2	702	1380	-	499	1198	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	76	26	395	79	27	411	561	338	-	-	574	352	-	-
Stage 1	150	264	-	114	218	-	-	-	-	-	-	-	-	-
Stage 2	361	212	-	479	259	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	16	14	389	36	15	410	350	350	-	-	363	363	-	-
Mov Cap-2 Maneuver	16	14	-	36	15	-	-	-	-	-	-	-	-	-
Stage 1	89	239	-	69	131	-	-	-	-	-	-	-	-	-
Stage 2	174	127	-	342	235	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	45.2	258.1	2.5	0.4
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	350	-	-	173	62	363	-	-
HCM Lane V/C Ratio	0.398	-	-	0.503	1.104	0.084	-	-
HCM Control Delay (s)	21.9	-	-	45.2	258.1	15.8	-	-
HCM Lane LOS	C	-	-	E	F	C	-	-
HCM 95th %tile Q(veh)	1.9	-	-	2.5	5.5	0.3	-	-

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	5	236	434	89	102	391	219	5	235	829	209	217
Future Volume (vph)	5	236	434	89	102	391	219	5	235	829	209	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1752	3505	1546	1752	3505	1568		1752	5036	1568	1752
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1752	3505	1546	1752	3505	1568		1752	5036	1568	1752
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	257	472	97	111	425	238	5	255	901	227	236
RTOR Reduction (vph)	0	0	0	71	0	0	185	0	0	0	152	0
Lane Group Flow (vph)	0	262	472	26	111	425	53	0	260	901	75	236
Confl. Peds. (#/hr)				3								3
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		17.1	26.1	26.1	11.2	20.2	20.2		17.1	24.9	24.9	16.7
Effective Green, g (s)		17.1	26.1	26.1	11.2	20.2	20.2		17.1	24.9	24.9	16.7
Actuated g/C Ratio		0.18	0.27	0.27	0.12	0.21	0.21		0.18	0.26	0.26	0.17
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		308	942	415	202	729	326		308	1291	402	301
v/s Ratio Prot		c0.15	0.13		0.06	c0.12			c0.15	c0.18		c0.13
v/s Ratio Perm				0.02			0.03				0.05	
v/c Ratio		0.85	0.50	0.06	0.55	0.58	0.16		0.84	0.70	0.19	0.78
Uniform Delay, d1		38.8	30.0	26.4	40.6	34.7	31.5		38.7	32.7	28.2	38.5
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.99
Incremental Delay, d2		19.6	0.4	0.1	3.0	1.2	0.2		18.6	1.7	0.2	12.5
Delay (s)		58.4	30.4	26.5	43.6	35.8	31.8		57.3	34.4	28.4	50.7
Level of Service		E	C	C	D	D	C		E	C	C	D
Approach Delay (s)			38.8			35.7				37.7		
Approach LOS			D			D				D		

Intersection Summary			
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	97.1	Sum of lost time (s)	18.2
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	731	221
Future Volume (vph)	731	221
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	4.9
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	1.00
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1568
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1568
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	795	240
RTOR Reduction (vph)	0	129
Lane Group Flow (vph)	795	111
Confl. Peds. (#/hr)		
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	24.5	24.5
Effective Green, g (s)	24.5	24.5
Actuated g/C Ratio	0.25	0.25
Clearance Time (s)	4.9	4.9
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	1270	395
v/s Ratio Prot	0.16	
v/s Ratio Perm		0.07
v/c Ratio	0.63	0.28
Uniform Delay, d1	32.2	29.2
Progression Factor	0.99	0.97
Incremental Delay, d2	1.0	0.4
Delay (s)	32.8	28.7
Level of Service	C	C
Approach Delay (s)	35.4	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	847	18	10	998	21	14
Future Vol, veh/h	847	18	10	998	21	14
Conflicting Peds, #/hr	0	7	7	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	864	18	10	1018	21	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	889	0	1409	448
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	529	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	764	-	131	561
Stage 1	-	-	-	-	368	-
Stage 2	-	-	-	-	558	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	759	-	126	557
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	541	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	29.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	182	-	-	759	-
HCM Lane V/C Ratio	0.196	-	-	0.013	-
HCM Control Delay (s)	29.5	-	-	9.8	0.1
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	853	22	17	975	36	49
Future Vol, veh/h	853	22	17	975	36	49
Conflicting Peds, #/hr	0	4	2	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	927	24	18	1060	39	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	955	0	1511	482
Stage 1	-	-	-	-	943	-
Stage 2	-	-	-	-	568	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	722	-	112	533
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	533	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	719	-	104	530
Mov Cap-2 Maneuver	-	-	-	-	104	-
Stage 1	-	-	-	-	340	-
Stage 2	-	-	-	-	499	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	39.4
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	194	-	-	719	-
HCM Lane V/C Ratio	0.476	-	-	0.026	-
HCM Control Delay (s)	39.4	-	-	10.1	0.3
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	2.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	14	4	49	10	2	36	12	13	1462	16	7	29	1075	6
Future Vol, veh/h	14	4	49	10	2	36	12	13	1462	16	7	29	1075	6
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	15	4	53	11	2	39	13	14	1572	17	8	31	1156	6

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1930	2907	591	2196	2902	813	849	1171	0	0	1160	1607	0	0
Stage 1	1246	1246	-	1653	1653	-	-	-	-	-	-	-	-	-
Stage 2	684	1661	-	543	1249	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	71	16	388	48	16	278	541	326	-	-	365	199	-	-
Stage 1	135	246	-	69	156	-	-	-	-	-	-	-	-	-
Stage 2	370	154	-	451	245	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	43	12	384	24	12	273	381	381	-	-	212	212	-	-
Mov Cap-2 Maneuver	43	12	-	24	12	-	-	-	-	-	-	-	-	-
Stage 1	124	199	-	63	142	-	-	-	-	-	-	-	-	-
Stage 2	291	141	-	310	198	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	144.7	153	0.3	0.8
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	381	-	-	85	67	212	-	-
HCM Lane V/C Ratio	0.071	-	-	0.848	0.77	0.183	-	-
HCM Control Delay (s)	15.2	-	-	144.7	153	25.8	-	-
HCM Lane LOS	C	-	-	F	F	D	-	-
HCM 95th %tile Q(veh)	0.2	-	-	4.5	3.5	0.7	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	177	147	4	49	1301	1109	147
Future Volume (vph)	177	147	4	49	1301	1109	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1562		1785	5036	5036	1546
Flt Permitted	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1562		1785	5036	5036	1546
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	186	155	4	52	1369	1167	155
RTOR Reduction (vph)	0	87	0	0	0	0	70
Lane Group Flow (vph)	186	68	0	56	1369	1167	85
Confl. Peds. (#/hr)		24		9			9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	NA	Perm
Protected Phases	7		5	5	2	6	
Permitted Phases		4					6
Actuated Green, G (s)	13.3	13.5		2.7	30.2	23.3	23.3
Effective Green, g (s)	13.3	13.5		2.7	30.2	23.3	23.3
Actuated g/C Ratio	0.25	0.26		0.05	0.57	0.44	0.44
Clearance Time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	451	400		91	2891	2230	684
v/s Ratio Prot	c0.10			0.03	c0.27	c0.23	
v/s Ratio Perm		0.04					0.06
v/c Ratio	0.41	0.17		0.62	0.47	0.52	0.12
Uniform Delay, d1	16.4	15.2		24.4	6.6	10.6	8.6
Progression Factor	1.00	1.00		1.01	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.2		11.7	0.1	0.2	0.1
Delay (s)	17.0	15.4		36.3	6.7	10.8	8.7
Level of Service	B	B		D	A	B	A
Approach Delay (s)	16.3				7.9	10.6	
Approach LOS	B				A	B	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	52.6	Sum of lost time (s)	13.3
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	19.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	4	2	115	27	4	59	25	48	1125	41	20	39	1059	15
Future Vol, veh/h	4	2	115	27	4	59	25	48	1125	41	20	39	1059	15
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	4	2	125	29	4	64	27	52	1223	45	22	42	1151	16

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1944	2730	590	2004	2716	647	852	1173	0	0	925	1279	0	0
Stage 1	1293	1293	-	1415	1415	-	-	-	-	-	-	-	-	-
Stage 2	651	1437	-	589	1301	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	70	20	388	64	21	357	539	325	-	-	492	289	-	-
Stage 1	125	233	-	103	204	-	-	-	-	-	-	-	-	-
Stage 2	388	199	-	423	231	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	30	12	386	~ 26	13	353	340	340	-	-	319	319	-	-
Mov Cap-2 Maneuver	30	12	-	~ 26	13	-	-	-	-	-	-	-	-	-
Stage 1	95	185	-	78	155	-	-	-	-	-	-	-	-	-
Stage 2	236	151	-	226	183	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	51	$ 473.8	1.1	1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	340	-	-	202	59	319	-	-
HCM Lane V/C Ratio	0.233	-	-	0.651	1.658	0.201	-	-
HCM Control Delay (s)	18.8	-	-	51	$ 473.8	19.1	-	-
HCM Lane LOS	C	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	0.9	-	-	3.9	9	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	6	213	335	205	109	398	196	9	228	948	194	254
Future Volume (vph)	6	213	335	205	109	398	196	9	228	948	194	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1752	3505	1568	1752	3505	1568		1752	5036	1538	1752
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1752	3505	1568	1752	3505	1568		1752	5036	1538	1752
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	232	364	223	118	433	213	10	248	1030	211	276
RTOR Reduction (vph)	0	0	0	168	0	0	163	0	0	0	121	0
Lane Group Flow (vph)	0	239	364	55	118	433	50	0	258	1030	90	276
Confl. Peds. (#/hr)											7	7
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		15.9	24.9	24.9	11.7	20.7	20.7		18.0	27.5	27.5	18.2
Effective Green, g (s)		15.9	24.9	24.9	11.7	20.7	20.7		18.0	27.5	27.5	18.2
Actuated g/C Ratio		0.16	0.25	0.25	0.12	0.21	0.21		0.18	0.27	0.27	0.18
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		277	868	388	203	721	322		313	1378	420	317
v/s Ratio Prot		c0.14	0.10		0.07	c0.12			c0.15	c0.20		c0.16
v/s Ratio Perm				0.04			0.03				0.06	
v/c Ratio		0.86	0.42	0.14	0.58	0.60	0.16		0.82	0.75	0.22	0.87
Uniform Delay, d1		41.2	31.7	29.5	42.1	36.2	32.7		39.7	33.3	28.2	40.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.99
Incremental Delay, d2		23.1	0.3	0.2	4.2	1.4	0.2		16.0	2.3	0.3	22.0
Delay (s)		64.3	32.1	29.6	46.3	37.6	33.0		55.7	35.6	28.4	61.6
Level of Service		E	C	C	D	D	C		E	D	C	E
Approach Delay (s)			40.7			37.6				38.0		
Approach LOS			D			D				D		

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.5	Sum of lost time (s)	18.2
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	767	215
Future Volume (vph)	767	215
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	4.9
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	1.00
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1568
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1568
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	834	234
RTOR Reduction (vph)	0	116
Lane Group Flow (vph)	834	118
Confl. Peds. (#/hr)		
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	27.7	27.7
Effective Green, g (s)	27.7	27.7
Actuated g/C Ratio	0.28	0.28
Clearance Time (s)	4.9	4.9
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	1388	432
v/s Ratio Prot	0.17	
v/s Ratio Perm		0.08
v/c Ratio	0.60	0.27
Uniform Delay, d1	31.6	28.5
Progression Factor	0.99	0.96
Incremental Delay, d2	0.7	0.3
Delay (s)	31.9	27.9
Level of Service	C	C
Approach Delay (s)	37.3	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	28	0	0	73	9	49	1062	54	7	69	1257	39
Future Vol, veh/h	0	0	28	0	0	73	9	49	1062	54	7	69	1257	39
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	30	0	0	79	10	53	1154	59	8	75	1366	42

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	712	-	-	613	1028	1416	0	0	886	1218	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	323	0	0	375	431	248	-	-	517	309	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	321	-	-	373	261	261	-	-	316	316	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.4	17.2	1.1	1.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	261	-	-	321	373	316	-	-
HCM Lane V/C Ratio	0.242	-	-	0.095	0.213	0.261	-	-
HCM Control Delay (s)	23.1	-	-	17.4	17.2	20.4	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	0.9	-	-	0.3	0.8	1	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	77	77	6	117	930	6	971	293
Future Volume (vph)	77	77	6	117	930	6	971	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.2	4.2
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.95		1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1524		1785	5036	1752	5036	1551
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1524		1785	5036	1752	5036	1551
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	84	7	127	1011	7	1055	318
RTOR Reduction (vph)	0	71	0	0	0	0	0	166
Lane Group Flow (vph)	84	13	0	134	1011	7	1055	152
Confl. Peds. (#/hr)		79		7				7
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	7.7	7.9		9.3	29.7	0.7	21.8	21.8
Effective Green, g (s)	7.7	7.9		9.3	29.7	0.7	21.8	21.8
Actuated g/C Ratio	0.15	0.15		0.18	0.58	0.01	0.42	0.42
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.2	4.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	267	234		322	2909	23	2135	657
v/s Ratio Prot	c0.05			c0.08	0.20	0.00	c0.21	
v/s Ratio Perm		0.01						0.10
v/c Ratio	0.31	0.06		0.42	0.35	0.30	0.49	0.23
Uniform Delay, d1	19.5	18.6		18.6	5.7	25.1	10.8	9.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1		0.9	0.1	7.4	0.2	0.2
Delay (s)	20.2	18.7		19.5	5.8	32.5	11.0	9.6
Level of Service	C	B		B	A	C	B	A
Approach Delay (s)	19.4				7.4		10.8	
Approach LOS	B				A		B	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	13.3
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	80	0	0	63	22	106	963	53	3	25	1010	31
Future Vol, veh/h	0	0	80	0	0	63	22	106	963	53	3	25	1010	31
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	87	0	0	68	24	115	1047	58	3	27	1098	34

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	581	-	-	555	826	1145	0	0	806	1107	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	393	0	0	409	557	336	-	-	572	350	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	387	-	-	408	347	347	-	-	360	360	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17	15.6	2.5	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	347	-	-	387	408	360	-	-
HCM Lane V/C Ratio	0.401	-	-	0.225	0.168	0.085	-	-
HCM Control Delay (s)	22.2	-	-	17	15.6	15.9	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	1.9	-	-	0.8	0.6	0.3	-	-

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	5	236	434	89	102	391	219	5	235	829	209	4
Future Volume (vph)	5	236	434	89	102	391	219	5	235	829	209	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00		1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1546	1752	3505	1568		1752	5036	1568	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1546	1752	3505	1568		1752	5036	1568	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	257	472	97	111	425	238	5	255	901	227	4
RTOR Reduction (vph)	0	0	0	71	0	0	185	0	0	0	152	0
Lane Group Flow (vph)	0	262	472	26	111	425	53	0	260	901	75	0
Confl. Peds. (#/hr)				3								
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		17.1	26.1	26.1	11.2	20.2	20.2		17.1	25.0	25.0	
Effective Green, g (s)		17.1	26.1	26.1	11.2	20.2	20.2		17.1	25.0	25.0	
Actuated g/C Ratio		0.18	0.27	0.27	0.11	0.21	0.21		0.18	0.26	0.26	
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		307	939	414	201	726	325		307	1292	402	
v/s Ratio Prot		c0.15	0.13		0.06	c0.12			c0.15	c0.18		
v/s Ratio Perm				0.02			0.03				0.05	
v/c Ratio		0.85	0.50	0.06	0.55	0.59	0.16		0.85	0.70	0.19	
Uniform Delay, d1		38.9	30.2	26.5	40.7	34.8	31.7		38.9	32.8	28.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		19.9	0.4	0.1	3.3	1.2	0.2		18.9	1.7	0.2	
Delay (s)		58.9	30.6	26.6	44.0	36.0	31.9		57.8	34.4	28.5	
Level of Service		E	C	C	D	D	C		E	C	C	
Approach Delay (s)			39.0			35.9				37.8		
Approach LOS			D			D				D		

Intersection Summary			
HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	18.2
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	217	731	221
Future Volume (vph)	217	731	221
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	4.9	4.9
Lane Util. Factor	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	5036	1568
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	5036	1568
Peak-hour factor, PHF	0.92	0.92	0.92
Adj. Flow (vph)	236	795	240
RTOR Reduction (vph)	0	0	128
Lane Group Flow (vph)	240	795	112
Confl. Peds. (#/hr)	3		
Turn Type	Prot	NA	Perm
Protected Phases	1	6	
Permitted Phases			6
Actuated Green, G (s)	16.9	24.8	24.8
Effective Green, g (s)	16.9	24.8	24.8
Actuated g/C Ratio	0.17	0.25	0.25
Clearance Time (s)	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0
Lane Grp Cap (vph)	303	1282	399
v/s Ratio Prot	c0.14	0.16	
v/s Ratio Perm			0.07
v/c Ratio	0.79	0.62	0.28
Uniform Delay, d1	38.6	32.1	29.1
Progression Factor	0.99	0.99	0.97
Incremental Delay, d2	13.2	0.9	0.4
Delay (s)	51.5	32.7	28.6
Level of Service	D	C	C
Approach Delay (s)		35.5	
Approach LOS		D	
Intersection Summary			

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	67	0	0	48	12	13	1476	20	7	29	1085	8
Future Vol, veh/h	0	0	67	0	0	48	12	13	1476	20	7	29	1085	8
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	72	0	0	52	13	14	1587	22	8	31	1167	9

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	598	-	-	823	858	1185	0	0	1174	1627	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	384	0	0	274	535	321	-	-	358	195	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	380	-	-	269	367	367	-	-	206	206	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	21.5	0.3	0.8
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	367	-	-	380	269	206	-	-
HCM Lane V/C Ratio	0.073	-	-	0.19	0.192	0.188	-	-
HCM Control Delay (s)	15.6	-	-	16.7	21.5	26.5	-	-
HCM Lane LOS	C	-	-	C	C	D	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.7	0.7	0.7	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	177	147	31	53	1301	18	1109	147
Future Volume (vph)	177	147	31	53	1301	18	1109	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1561		1774	5036	1752	5036	1545
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1561		1774	5036	1752	5036	1545
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	186	155	33	56	1369	19	1167	155
RTOR Reduction (vph)	0	63	0	0	0	0	0	74
Lane Group Flow (vph)	186	92	0	89	1369	19	1167	81
Confl. Peds. (#/hr)		24		9				9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	13.4	13.6		6.8	29.2	0.7	23.1	23.1
Effective Green, g (s)	13.4	13.6		6.8	29.2	0.7	23.1	23.1
Actuated g/C Ratio	0.24	0.24		0.12	0.52	0.01	0.41	0.41
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	423	375		213	2598	21	2055	630
v/s Ratio Prot	c0.10			0.05	c0.27	0.01	c0.23	
v/s Ratio Perm		0.06						0.05
v/c Ratio	0.44	0.25		0.42	0.53	0.90	0.57	0.13
Uniform Delay, d1	18.4	17.4		23.1	9.1	27.9	12.9	10.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3		1.3	0.2	151.1	0.4	0.1
Delay (s)	19.1	17.7		24.5	9.3	179.0	13.3	10.6
Level of Service	B	B		C	A	F	B	B
Approach Delay (s)	18.5				10.2		15.3	
Approach LOS	B				B		B	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	56.6	Sum of lost time (s)	13.3
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	121	0	0	90	25	48	1129	43	20	39	1086	15
Future Vol, veh/h	0	0	121	0	0	90	25	48	1129	43	20	39	1086	15
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	132	0	0	98	27	52	1227	47	22	42	1180	16

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	604	-	-	650	874	1202	0	0	930	1285	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	380	0	0	355	525	315	-	-	489	287	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	378	-	-	351	327	327	-	-	307	307	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.5	19.2	1.1	1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	327	-	-	378	351	307	-	-
HCM Lane V/C Ratio	0.243	-	-	0.348	0.279	0.209	-	-
HCM Control Delay (s)	19.5	-	-	19.5	19.2	19.8	-	-
HCM Lane LOS	C	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	0.9	-	-	1.5	1.1	0.8	-	-

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	6	213	335	205	109	398	196	9	228	948	194	6
Future Volume (vph)	6	213	335	205	109	398	196	9	228	948	194	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1568	1752	3505	1568		1752	5036	1538	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1568	1752	3505	1568		1752	5036	1538	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	232	364	223	118	433	213	10	248	1030	211	7
RTOR Reduction (vph)	0	0	0	167	0	0	162	0	0	0	121	0
Lane Group Flow (vph)	0	239	364	56	118	433	51	0	258	1030	90	0
Confl. Peds. (#/hr)											7	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		15.0	25.1	25.1	10.6	20.7	20.7		17.0	27.7	27.7	
Effective Green, g (s)		15.0	25.1	25.1	10.6	20.7	20.7		17.0	27.7	27.7	
Actuated g/C Ratio		0.15	0.25	0.25	0.11	0.21	0.21		0.17	0.28	0.28	
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		263	883	395	186	728	325		299	1400	427	
v/s Ratio Prot		c0.14	0.10		0.07	c0.12			c0.15	c0.20		
v/s Ratio Perm				0.04			0.03				0.06	
v/c Ratio		0.91	0.41	0.14	0.63	0.59	0.16		0.86	0.74	0.21	
Uniform Delay, d1		41.6	31.1	28.9	42.6	35.7	32.3		40.2	32.6	27.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		32.1	0.3	0.2	6.9	1.3	0.2		21.7	2.0	0.2	
Delay (s)		73.7	31.4	29.1	49.5	37.0	32.5		61.9	34.7	27.8	
Level of Service		E	C	C	D	D	C		E	C	C	
Approach Delay (s)			43.0			37.7				38.4		
Approach LOS			D			D				D		

Intersection Summary			
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	18.2
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	254	767	215
Future Volume (vph)	254	767	215
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	4.9	4.9
Lane Util. Factor	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	5036	1568
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	5036	1568
Peak-hour factor, PHF	0.92	0.92	0.92
Adj. Flow (vph)	276	834	234
RTOR Reduction (vph)	0	0	117
Lane Group Flow (vph)	283	834	117
Confl. Peds. (#/hr)	7		
Turn Type	Prot	NA	Perm
Protected Phases	1	6	
Permitted Phases			6
Actuated Green, G (s)	18.0	28.7	28.7
Effective Green, g (s)	18.0	28.7	28.7
Actuated g/C Ratio	0.18	0.29	0.29
Clearance Time (s)	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0
Lane Grp Cap (vph)	316	1451	451
v/s Ratio Prot	c0.16	0.17	
v/s Ratio Perm			0.07
v/c Ratio	0.90	0.57	0.26
Uniform Delay, d1	39.9	30.2	27.3
Progression Factor	0.99	0.99	0.96
Incremental Delay, d2	25.9	0.6	0.3
Delay (s)	65.5	30.4	26.6
Level of Service	E	C	C
Approach Delay (s)		37.1	
Approach LOS		D	

Intersection Summary

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	52	53
Average Queue (ft)	6	24
95th Queue (ft)	27	51
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	31	55	75	31	96
Average Queue (ft)	3	4	12	1	42
95th Queue (ft)	18	25	46	10	73
Link Distance (ft)	281	281	745	745	635
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	UL	T	UL	TR
Maximum Queue (ft)	74	77	70	93	73	48
Average Queue (ft)	24	36	29	4	29	2
95th Queue (ft)	59	59	62	33	55	16
Link Distance (ft)	1033	1240		270		898
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			75		75	
Storage Blk Time (%)			3	0	0	
Queuing Penalty (veh)			10	0	1	

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	70	104	162	161	226	293	31	248	205	160	125
Average Queue (ft)	36	24	72	76	102	127	6	149	105	88	57
95th Queue (ft)	64	54	128	154	197	231	25	215	175	140	90
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)		0						26		4	0
Queuing Penalty (veh)		0						2		13	1

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	NB	SB
Directions Served	R	R	UL	T	TR	UL
Maximum Queue (ft)	92	79	178	31	53	31
Average Queue (ft)	41	39	44	1	2	5
95th Queue (ft)	68	66	98	10	17	24
Link Distance (ft)	407	1233		570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			85			75
Storage Blk Time (%)			1			
Queuing Penalty (veh)			4			

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	T	T	R	UL	T	T	T
Maximum Queue (ft)	290	190	259	68	194	214	200	151	220	356	305	255
Average Queue (ft)	159	87	85	22	72	127	91	49	197	206	170	130
95th Queue (ft)	253	145	165	49	141	190	169	102	250	336	269	199
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	2		1				4	1	25	4		2
Queuing Penalty (veh)	3		1				8	2	70	9		4

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	UL	T	T	T	R
Maximum Queue (ft)	150	279	301	234	194	125
Average Queue (ft)	45	174	143	148	130	59
95th Queue (ft)	93	275	236	216	193	103
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)	0	11			20	0
Queuing Penalty (veh)	0	26			44	1

Network Summary

Network wide Queuing Penalty: 200

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	72	52
Average Queue (ft)	11	22
95th Queue (ft)	45	46
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	EB	EB	WB	NB
Directions Served	T	TR	LT	LR
Maximum Queue (ft)	31	29	97	142
Average Queue (ft)	2	2	22	44
95th Queue (ft)	15	14	75	91
Link Distance (ft)	281	281	745	635
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	UL	TR	UL	T
Maximum Queue (ft)	72	54	50	31	88	52
Average Queue (ft)	38	30	15	1	20	2
95th Queue (ft)	56	56	42	10	51	17
Link Distance (ft)	1033	1240		270		898
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			75		75	
Storage Blk Time (%)					0	
Queuing Penalty (veh)					1	

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	180	320	98	217	268	266	49	278	258	181	73
Average Queue (ft)	79	66	51	114	134	151	10	152	122	90	32
95th Queue (ft)	155	192	88	217	248	260	37	232	206	149	60
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)								0	0		
Queuing Penalty (veh)								1	0		
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)	3	0						21		6	
Queuing Penalty (veh)	5	0						4		9	

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	SB	SB	SB	SB
Directions Served	R	R	UL	TR	UL	T	T	TR
Maximum Queue (ft)	78	103	57	50	72	28	31	97
Average Queue (ft)	46	50	25	2	30	1	1	3
95th Queue (ft)	72	90	58	16	58	9	10	32
Link Distance (ft)	407	1233		570		608	608	608
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			85		75			
Storage Blk Time (%)					1			
Queuing Penalty (veh)					3			

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	T	T	R	UL	T	T	T
Maximum Queue (ft)	268	278	152	259	195	194	188	170	220	424	381	253
Average Queue (ft)	143	97	78	51	80	125	93	46	181	223	192	148
95th Queue (ft)	245	173	139	129	150	174	156	98	256	365	294	218
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	2		0	1			5	0	20	3		4
Queuing Penalty (veh)	4		1	2			9	0	65	6		8

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	UL	T	T	T	R
Maximum Queue (ft)	85	279	341	306	208	170
Average Queue (ft)	40	163	133	152	142	62
95th Queue (ft)	73	250	225	225	189	121
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		7	0		22	2
Queuing Penalty (veh)		19	0		46	5

Network Summary

Network wide Queuing Penalty: 188

Appendix J: Cumulative Year 2035 plus Project Traffic Conditions

Intersection						
Int Delay, s/veh	0.9					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1046	43	8	632	23	13
Future Vol, veh/h	1046	43	8	632	23	13
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1137	47	9	687	25	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1189	0	1528	597
Stage 1	-	-	-	-	1166	-
Stage 2	-	-	-	-	362	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	589	-	109	449
Stage 1	-	-	-	-	261	-
Stage 2	-	-	-	-	678	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	586	-	106	447
Mov Cap-2 Maneuver	-	-	-	-	106	-
Stage 1	-	-	-	-	260	-
Stage 2	-	-	-	-	661	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	38.5
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	146	-	-	586	-
HCM Lane V/C Ratio	0.268	-	-	0.015	-
HCM Control Delay (s)	38.5	-	-	11.2	0.1
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	1	-	-	0	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1025	49	23	609	34	57
Future Vol, veh/h	1025	49	23	609	34	57
Conflicting Peds, #/hr	0	4	4	0	4	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1114	53	25	662	37	62

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1171	0	1530	592
Stage 1	-	-	-	-	1145	-
Stage 2	-	-	-	-	385	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	598	-	109	452
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	660	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	596	-	101	449
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	614	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		0.7		40.7	
HCM LOS					E	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	196	-	-	596	-
HCM Lane V/C Ratio	0.505	-	-	0.042	-
HCM Control Delay (s)	40.7	-	-	11.3	0.3
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	2.5	-	-	0.1	-

Intersection	
Int Delay, s/veh	72.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	28	0	43	10	2	62	9	116	1077	54	7	69	1302	102
Future Vol, veh/h	28	0	43	10	2	62	9	116	1077	54	7	69	1302	102
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	30	0	47	11	2	67	10	126	1171	59	8	75	1415	111

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2387	3152	771	2210	3178	621	1114	1534	0	0	897	1235	0	0
Stage 1	1645	1645	-	1478	1478	-	-	-	-	-	-	-	-	-
Stage 2	742	1507	-	732	1700	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	37	11	296	48	10	371	387	217	-	-	509	304	-	-
Stage 1	70	157	-	93	190	-	-	-	-	-	-	-	-	-
Stage 2	341	184	-	346	148	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	~ 6	3	294	17	3	369	221	221	-	-	311	311	-	-
Mov Cap-2 Maneuver	~ 6	3	-	17	3	-	-	-	-	-	-	-	-	-
Stage 1	~ 27	114	-	35	72	-	-	-	-	-	-	-	-	-
Stage 2	104	70	-	213	108	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 2371.5	$ 448.9	4.4	1.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	221	-	-	15	52	311	-	-
HCM Lane V/C Ratio	0.615	-	-	5.145	1.547	0.266	-	-
HCM Control Delay (s)	44.4	-		$ 2371.5	$ 448.9	20.7	-	-
HCM Lane LOS	E	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	3.6	-	-	10.5	7.5	1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	95	128	275	1000	985	355
Future Volume (vph)	95	128	275	1000	985	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0	4.2	4.9	4.2	4.2
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.95	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1517	1787	5036	5036	1550
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1517	1787	5036	5036	1550
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	139	299	1087	1071	386
RTOR Reduction (vph)	0	114	0	0	0	190
Lane Group Flow (vph)	103	25	299	1087	1071	196
Confl. Peds. (#/hr)		79	7			7
Heavy Vehicles (%)	1%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	10.0	10.2	14.9	38.0	19.6	19.6
Effective Green, g (s)	10.0	10.2	14.9	38.0	19.6	19.6
Actuated g/C Ratio	0.18	0.18	0.26	0.67	0.34	0.34
Clearance Time (s)	4.2	4.0	4.2	4.9	4.2	4.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	312	270	466	3351	1728	532
v/s Ratio Prot	c0.06		c0.17	0.22	c0.21	
v/s Ratio Perm		0.02				0.13
v/c Ratio	0.33	0.09	0.64	0.32	0.62	0.37
Uniform Delay, d1	20.6	19.6	18.7	4.1	15.6	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	3.0	0.1	0.7	0.4
Delay (s)	21.2	19.7	21.7	4.1	16.3	14.5
Level of Service	C	B	C	A	B	B
Approach Delay (s)	20.4			7.9	15.8	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	57.1	Sum of lost time (s)	12.6
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	21.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	5	2	75	6	11	47	22	117	1196	51	3	25	1070	30
Future Vol, veh/h	5	2	75	6	11	47	22	117	1196	51	3	25	1070	30
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	5	2	82	7	12	51	24	127	1300	55	3	27	1163	33

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2081	2912	613	2160	2901	680	873	1209	0	0	989	1357	0	0
Stage 1	1253	1253	-	1632	1632	-	-	-	-	-	-	-	-	-
Stage 2	828	1659	-	528	1269	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	57	16	375	51	16	339	525	313	-	-	453	265	-	-
Stage 1	134	244	-	72	160	-	-	-	-	-	-	-	-	-
Stage 2	302	155	-	460	240	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	7	370	18	~ 7	338	322	322	-	-	273	273	-	-
Mov Cap-2 Maneuver	-	7	-	18	~ 7	-	-	-	-	-	-	-	-	-
Stage 1	70	214	-	38	85	-	-	-	-	-	-	-	-	-
Stage 2	117	82	-	315	211	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		$ 843.3	2.6	0.5
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	322	-	-	-	31	273	-	-
HCM Lane V/C Ratio	0.469	-	-	-	2.244	0.111	-	-
HCM Control Delay (s)	25.6	-	-	-	$ 843.3	19.8	-	-
HCM Lane LOS	D	-	-	-	F	C	-	-
HCM 95th %tile Q(veh)	2.4	-	-	-	8.1	0.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	5	306	434	89	102	366	273	5	223	951	209	229
Future Volume (vph)	5	306	434	89	102	366	273	5	223	951	209	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1752	3505	1546	1752	3505	1568		1752	5036	1568	1752
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1752	3505	1546	1752	3505	1568		1752	5036	1568	1752
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	333	472	97	111	398	297	5	242	1034	227	249
RTOR Reduction (vph)	0	0	0	70	0	0	213	0	0	0	130	0
Lane Group Flow (vph)	0	338	472	27	111	398	84	0	247	1034	97	249
Confl. Peds. (#/hr)				3								3
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		19.1	27.7	27.7	11.2	19.8	19.8		14.0	27.7	27.7	14.0
Effective Green, g (s)		19.1	27.7	27.7	11.2	19.8	19.8		14.0	27.7	27.7	14.0
Actuated g/C Ratio		0.19	0.28	0.28	0.11	0.20	0.20		0.14	0.28	0.28	0.14
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		338	982	433	198	702	314		248	1411	439	248
v/s Ratio Prot		c0.19	0.13		0.06	c0.11			c0.14	c0.21		c0.14
v/s Ratio Perm				0.02			0.05				0.06	
v/c Ratio		1.00	0.48	0.06	0.56	0.57	0.27		1.00	0.73	0.22	1.00
Uniform Delay, d1		39.8	29.6	26.0	41.5	35.6	33.4		42.4	32.2	27.3	42.4
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.99
Incremental Delay, d2		49.0	0.4	0.1	3.6	1.1	0.5		55.7	2.0	0.3	58.2
Delay (s)		88.8	29.9	26.1	45.1	36.7	33.8		98.0	34.2	27.5	100.3
Level of Service		F	C	C	D	D	C		F	C	C	F
Approach Delay (s)			51.5			36.8				43.7		
Approach LOS			D			D				D		

Intersection Summary			
HCM 2000 Control Delay	43.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	98.8	Sum of lost time (s)	18.2
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	764	241
Future Volume (vph)	764	241
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	4.9
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	1.00
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1568
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1568
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	830	262
RTOR Reduction (vph)	0	131
Lane Group Flow (vph)	830	131
Confl. Peds. (#/hr)		
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	27.7	27.7
Effective Green, g (s)	27.7	27.7
Actuated g/C Ratio	0.28	0.28
Clearance Time (s)	4.9	4.9
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	1411	439
v/s Ratio Prot	0.16	
v/s Ratio Perm		0.08
v/c Ratio	0.59	0.30
Uniform Delay, d1	30.6	27.9
Progression Factor	0.99	0.98
Incremental Delay, d2	0.6	0.4
Delay (s)	31.0	27.7
Level of Service	C	C
Approach Delay (s)	43.2	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	867	32	11	1009	32	15
Future Vol, veh/h	867	32	11	1009	32	15
Conflicting Peds, #/hr	0	7	7	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	885	33	11	1030	33	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	925	0	1446	466
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	537	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	741	-	124	546
Stage 1	-	-	-	-	356	-
Stage 2	-	-	-	-	553	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	736	-	119	542
Mov Cap-2 Maneuver	-	-	-	-	119	-
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	534	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	37.4
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	158	-	-	736	-
HCM Lane V/C Ratio	0.304	-	-	0.015	-
HCM Control Delay (s)	37.4	-	-	10	0.2
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	859	37	30	982	42	58
Future Vol, veh/h	859	37	30	982	42	58
Conflicting Peds, #/hr	0	4	2	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	934	40	33	1067	46	63

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	978	0	1560	493
Stage 1	-	-	-	-	958	-
Stage 2	-	-	-	-	602	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	707	-	104	524
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	512	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	704	-	92	521
Mov Cap-2 Maneuver	-	-	-	-	92	-
Stage 1	-	-	-	-	334	-
Stage 2	-	-	-	-	452	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	53.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	176	-	-	704	-
HCM Lane V/C Ratio	0.618	-	-	0.046	-
HCM Control Delay (s)	53.8	-	-	10.4	0.6
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	3.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	79.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	48	4	83	10	3	36	12	62	1499	16	7	29	1121	52
Future Vol, veh/h	48	4	83	10	3	36	12	62	1499	16	7	29	1121	52
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	52	4	89	11	3	39	13	67	1612	17	8	31	1205	56

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2126	3127	641	2362	3147	833	921	1270	0	0	1189	1647	0	0
Stage 1	1320	1320	-	1799	1799	-	-	-	-	-	-	-	-	-
Stage 2	806	1807	-	563	1348	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	54	11	360	38	11	269	494	292	-	-	351	190	-	-
Stage 1	120	226	-	55	132	-	-	-	-	-	-	-	-	-
Stage 2	312	131	-	438	220	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	~ 19	6	357	~ 8	6	264	301	301	-	-	202	202	-	-
Mov Cap-2 Maneuver	~ 19	6	-	~ 8	6	-	-	-	-	-	-	-	-	-
Stage 1	87	181	-	40	95	-	-	-	-	-	-	-	-	-
Stage 2	189	95	-	259	176	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 1437.6	$ 798.2	1	0.8
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	301	-	-	39	26	202	-	-
HCM Lane V/C Ratio	0.264	-	-	3.722	2.026	0.192	-	-
HCM Control Delay (s)	21.2	-	-	$ 1437.6	$ 798.2	27	-	-
HCM Lane LOS	C	-	-	F	F	D	-	-
HCM 95th %tile Q(veh)	1	-	-	16.6	6.4	0.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	212	236	4	178	1352	1137	199
Future Volume (vph)	212	236	4	178	1352	1137	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1560		1786	5036	5036	1544
Flt Permitted	0.95	1.00		0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1560		1786	5036	5036	1544
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	223	248	4	187	1423	1197	209
RTOR Reduction (vph)	0	185	0	0	0	0	96
Lane Group Flow (vph)	223	63	0	191	1423	1197	113
Confl. Peds. (#/hr)		24		9			9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	NA	Perm
Protected Phases	7		5	5	2	6	
Permitted Phases		4					6
Actuated Green, G (s)	14.9	15.1		10.6	35.9	21.1	21.1
Effective Green, g (s)	14.9	15.1		10.6	35.9	21.1	21.1
Actuated g/C Ratio	0.25	0.25		0.18	0.60	0.35	0.35
Clearance Time (s)	4.2	4.0		4.2	4.9	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	444	393		316	3018	1773	543
v/s Ratio Prot	c0.12			c0.11	0.28	c0.24	
v/s Ratio Perm		0.04					0.07
v/c Ratio	0.50	0.16		0.60	0.47	0.68	0.21
Uniform Delay, d1	19.3	17.5		22.7	6.7	16.5	13.6
Progression Factor	1.00	1.00		1.00	0.99	1.00	1.00
Incremental Delay, d2	0.9	0.2		3.2	0.1	1.0	0.2
Delay (s)	20.2	17.6		25.9	6.8	17.5	13.8
Level of Service	C	B		C	A	B	B
Approach Delay (s)	18.9				9.0	17.0	
Approach LOS	B				A	B	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	13.3
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	51.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	6	2	104	27	4	60	25	59	1302	41	20	40	1177	13
Future Vol, veh/h	6	2	104	27	4	60	25	59	1302	41	20	40	1177	13
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	7	2	113	29	4	65	27	64	1415	45	22	43	1279	14

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	2174	3075	653	2274	3060	743	944	1299	0	0	1066	1471	0	0
Stage 1	1422	1422	-	1631	1631	-	-	-	-	-	-	-	-	-
Stage 2	752	1653	-	643	1429	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.42	6.52	7.12	6.42	6.52	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	7.32	5.52	-	7.32	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.72	5.52	-	6.72	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.81	4.01	3.91	3.81	4.01	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	50	12	353	43	12	309	480	282	-	-	411	233	-	-
Stage 1	101	202	-	72	160	-	-	-	-	-	-	-	-	-
Stage 2	337	156	-	392	201	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	11	6	351	~ 13	6	305	295	295	-	-	257	257	-	-
Mov Cap-2 Maneuver	11	6	-	~ 13	6	-	-	-	-	-	-	-	-	-
Stage 1	69	150	-	49	110	-	-	-	-	-	-	-	-	-
Stage 2	176	107	-	196	149	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	267	$ 1254.1	1.3	1.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	295	-	-	95	31	257	-	-
HCM Lane V/C Ratio	0.31	-	-	1.281	3.191	0.254	-	-
HCM Control Delay (s)	22.6	-	-	267	$ 1254.1	23.7	-	-
HCM Lane LOS	C	-	-	F	F	C	-	-
HCM 95th %tile Q(veh)	1.3	-	-	8.6	11.7	1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	6	271	335	205	109	380	239	9	218	1035	194	276
Future Volume (vph)	6	271	335	205	109	380	239	9	218	1035	194	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (prot)		1752	3505	1568	1752	3505	1568		1752	5036	1538	1752
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	0.95
Satd. Flow (perm)		1752	3505	1568	1752	3505	1568		1752	5036	1538	1752
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	295	364	223	118	413	260	10	237	1125	211	300
RTOR Reduction (vph)	0	0	0	167	0	0	208	0	0	0	109	0
Lane Group Flow (vph)	0	302	364	56	118	413	52	0	247	1125	102	300
Confl. Peds. (#/hr)											7	7
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		17.0	25.6	25.6	11.7	20.3	20.3		16.4	28.8	28.8	17.0
Effective Green, g (s)		17.0	25.6	25.6	11.7	20.3	20.3		16.4	28.8	28.8	17.0
Actuated g/C Ratio		0.17	0.25	0.25	0.12	0.20	0.20		0.16	0.28	0.28	0.17
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	4.2
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		294	885	396	202	702	314		283	1431	437	294
v/s Ratio Prot		c0.17	0.10		0.07	c0.12			c0.14	c0.22		c0.17
v/s Ratio Perm				0.04			0.03				0.07	
v/c Ratio		1.03	0.41	0.14	0.58	0.59	0.17		0.87	0.79	0.23	1.02
Uniform Delay, d1		42.1	31.6	29.3	42.5	36.7	33.5		41.4	33.4	27.8	42.1
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	0.99
Incremental Delay, d2		59.7	0.3	0.2	4.3	1.3	0.3		24.3	2.9	0.3	57.8
Delay (s)		101.8	31.9	29.5	46.8	38.0	33.7		65.7	36.3	28.1	99.6
Level of Service		F	C	C	D	D	C		E	D	C	F
Approach Delay (s)			55.0			37.9				39.8		
Approach LOS			E			D				D		

Intersection Summary			
HCM 2000 Control Delay	43.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	101.3	Sum of lost time (s)	18.2
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	818	249
Future Volume (vph)	818	249
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.9	4.9
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	1.00
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1568
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1568
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	889	271
RTOR Reduction (vph)	0	124
Lane Group Flow (vph)	889	147
Confl. Peds. (#/hr)		
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	29.4	29.4
Effective Green, g (s)	29.4	29.4
Actuated g/C Ratio	0.29	0.29
Clearance Time (s)	4.9	4.9
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	1461	455
v/s Ratio Prot	0.18	
v/s Ratio Perm		0.09
v/c Ratio	0.61	0.32
Uniform Delay, d1	31.0	28.2
Progression Factor	0.99	0.97
Incremental Delay, d2	0.7	0.4
Delay (s)	31.3	27.8
Level of Service	C	C
Approach Delay (s)	44.7	
Approach LOS	D	

Intersection Summary

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1025	49	23	609	34	57
Future Vol, veh/h	1025	49	23	609	34	57
Conflicting Peds, #/hr	0	4	4	0	4	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	1114	53	25	662	37	62

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1171	0	1530	592
Stage 1	-	-	-	-	1145	-
Stage 2	-	-	-	-	385	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	598	-	109	452
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	660	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	596	-	101	449
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	614	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	31.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	101	449	-	-	596	-
HCM Lane V/C Ratio	0.366	0.138	-	-	0.042	-
HCM Control Delay (s)	59.9	14.3	-	-	11.3	0.3
HCM Lane LOS	F	B	-	-	B	A
HCM 95th %tile Q(veh)	1.5	0.5	-	-	0.1	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	71	0	0	74	9	116	1105	54	7	69	1312	104
Future Vol, veh/h	0	0	71	0	0	74	9	116	1105	54	7	69	1312	104
Conflicting Peds, #/hr	1	0	0	0	0	1	0	8	0	5	0	5	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	77	0	0	80	10	126	1201	59	8	75	1426	113

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	778	-	-	636	1124	1547	0	0	920	1265	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	293	0	0	362	382	213	-	-	495	293	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	291	-	-	360	215	215	-	-	299	299	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.8	17.9	4.5	1.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	215	-	-	291	360	299	-	-
HCM Lane V/C Ratio	0.632	-	-	0.265	0.223	0.276	-	-
HCM Control Delay (s)	46.6	-	-	21.8	17.9	21.6	-	-
HCM Lane LOS	E	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	3.7	-	-	1	0.8	1.1	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	95	128	6	286	1000	28	985	355
Future Volume (vph)	95	128	6	286	1000	28	985	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.2	4.2
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.95		1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1513		1786	5036	1752	5036	1549
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1513		1786	5036	1752	5036	1549
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	139	7	311	1087	30	1071	386
RTOR Reduction (vph)	0	116	0	0	0	0	0	198
Lane Group Flow (vph)	103	23	0	318	1087	30	1071	188
Confl. Peds. (#/hr)		79		7				7
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	10.0	10.2		19.1	36.7	0.8	19.1	19.1
Effective Green, g (s)	10.0	10.2		19.1	36.7	0.8	19.1	19.1
Actuated g/C Ratio	0.16	0.17		0.31	0.60	0.01	0.31	0.31
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.2	4.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	293	253		561	3039	23	1582	486
v/s Ratio Prot	c0.06			c0.18	0.22	0.02	c0.21	
v/s Ratio Perm		0.02						0.12
v/c Ratio	0.35	0.09		0.57	0.36	1.30	0.68	0.39
Uniform Delay, d1	22.5	21.4		17.4	6.1	30.0	18.2	16.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2		1.3	0.1	293.5	1.2	0.5
Delay (s)	23.3	21.5		18.7	6.2	323.5	19.3	16.8
Level of Service	C	C		B	A	F	B	B
Approach Delay (s)	22.3				9.0		24.8	
Approach LOS	C				A		C	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	13.3
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	82	0	0	64	22	117	1201	53	3	25	1076	30
Future Vol, veh/h	0	0	82	0	0	64	22	117	1201	53	3	25	1076	30
Conflicting Peds, #/hr	0	0	2	2	0	0	0	13	0	2	0	2	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	89	0	0	70	24	127	1305	58	3	27	1170	33

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	617	-	-	684	878	1216	0	0	995	1365	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	373	0	0	337	522	310	-	-	450	262	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	368	-	-	336	318	318	-	-	270	270	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.9	18.5	2.6	0.5
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	318	-	-	368	336	270	-	-
HCM Lane V/C Ratio	0.475	-	-	0.242	0.207	0.113	-	-
HCM Control Delay (s)	26.1	-	-	17.9	18.5	20	-	-
HCM Lane LOS	D	-	-	C	C	C	-	-
HCM 95th %tile Q(veh)	2.4	-	-	0.9	0.8	0.4	-	-

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	5	306	434	89	102	366	273	5	223	951	209	7
Future Volume (vph)	5	306	434	89	102	366	273	5	223	951	209	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	
Frpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	1.00		1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1546	1752	3505	1568		1752	5036	1568	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1546	1752	3505	1568		1752	5036	1568	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	333	472	97	111	398	297	5	242	1034	227	8
RTOR Reduction (vph)	0	0	0	70	0	0	200	0	0	0	129	0
Lane Group Flow (vph)	0	338	472	27	111	398	97	0	247	1034	98	0
Confl. Peds. (#/hr)				3								
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		19.0	27.6	27.6	11.3	19.9	19.9		14.0	27.4	27.4	
Effective Green, g (s)		19.0	27.6	27.6	11.3	19.9	19.9		14.0	27.4	27.4	
Actuated g/C Ratio		0.19	0.28	0.28	0.11	0.20	0.20		0.14	0.28	0.28	
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		334	972	428	198	701	313		246	1386	431	
v/s Ratio Prot		c0.19	0.13		0.06	c0.11			c0.14	c0.21		
v/s Ratio Perm				0.02			0.06				0.06	
v/c Ratio		1.01	0.49	0.06	0.56	0.57	0.31		1.00	0.75	0.23	
Uniform Delay, d1		40.2	30.0	26.4	41.7	35.9	33.9		42.8	32.9	27.9	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		52.3	0.4	0.1	3.6	1.1	0.6		58.4	2.2	0.3	
Delay (s)		92.6	30.4	26.5	45.3	37.0	34.5		101.2	35.1	28.1	
Level of Service		F	C	C	D	D	C		F	D	C	
Approach Delay (s)			53.1			37.2				44.9		
Approach LOS			D			D				D		

Intersection Summary			
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	99.5	Sum of lost time (s)	18.2
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	229	764	241
Future Volume (vph)	229	764	241
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	4.9	4.9
Lane Util. Factor	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	5036	1568
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	5036	1568
Peak-hour factor, PHF	0.92	0.92	0.92
Adj. Flow (vph)	249	830	262
RTOR Reduction (vph)	0	0	130
Lane Group Flow (vph)	257	830	132
Confl. Peds. (#/hr)	3		
Turn Type	Prot	NA	Perm
Protected Phases	1	6	
Permitted Phases			6
Actuated Green, G (s)	15.0	28.4	28.4
Effective Green, g (s)	15.0	28.4	28.4
Actuated g/C Ratio	0.15	0.29	0.29
Clearance Time (s)	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0
Lane Grp Cap (vph)	264	1437	447
v/s Ratio Prot	c0.15	0.16	
v/s Ratio Perm			0.08
v/c Ratio	0.97	0.58	0.30
Uniform Delay, d1	42.1	30.4	27.7
Progression Factor	0.99	0.99	0.98
Incremental Delay, d2	47.7	0.6	0.4
Delay (s)	89.5	30.7	27.5
Level of Service	F	C	C
Approach Delay (s)		41.3	
Approach LOS		D	

Intersection Summary

Intersection	
Int Delay, s/veh	2.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	859	37	30	982	42	58
Future Vol, veh/h	859	37	30	982	42	58
Conflicting Peds, #/hr	0	4	2	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	1	1	3	1	1
Mvmt Flow	934	40	33	1067	46	63

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	978	0	1560	493
Stage 1	-	-	-	-	958	-
Stage 2	-	-	-	-	602	-
Critical Hdwy	-	-	4.12	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	-	-	2.21	-	3.51	3.31
Pot Cap-1 Maneuver	-	-	707	-	104	524
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	512	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	704	-	92	521
Mov Cap-2 Maneuver	-	-	-	-	92	-
Stage 1	-	-	-	-	334	-
Stage 2	-	-	-	-	452	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	40.1
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	92	521	-	-	704	-
HCM Lane V/C Ratio	0.496	0.121	-	-	0.046	-
HCM Control Delay (s)	77.7	12.9	-	-	10.4	0.6
HCM Lane LOS	F	B	-	-	B	A
HCM 95th %tile Q(veh)	2.2	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	135	0	0	49	12	62	1547	20	7	29	1131	55
Future Vol, veh/h	0	0	135	0	0	49	12	62	1547	20	7	29	1131	55
Conflicting Peds, #/hr	0	0	1	1	0	0	0	9	0	18	0	18	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	75	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	145	0	0	53	13	67	1663	22	8	31	1216	59

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	648	-	-	861	931	1284	0	0	1230	1703	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	356	0	0	258	488	287	-	-	334	178	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	353	-	-	254	287	287	-	-	188	188	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.1	22.8	1	0.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	287	-	-	353	254	188	-	-
HCM Lane V/C Ratio	0.277	-	-	0.411	0.207	0.206	-	-
HCM Control Delay (s)	22.2	-	-	22.1	22.8	29.1	-	-
HCM Lane LOS	C	-	-	C	C	D	-	-
HCM 95th %tile Q(veh)	1.1	-	-	1.9	0.8	0.7	-	-

Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	212	236	31	182	1352	52	1137	199
Future Volume (vph)	212	236	31	182	1352	52	1137	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Lane Util. Factor	1.00	1.00		1.00	0.91	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1559		1782	5036	1752	5036	1543
Flt Permitted	0.95	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1787	1559		1782	5036	1752	5036	1543
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	223	248	33	192	1423	55	1197	209
RTOR Reduction (vph)	0	188	0	0	0	0	0	98
Lane Group Flow (vph)	223	60	0	225	1423	55	1197	111
Confl. Peds. (#/hr)		24		9				9
Heavy Vehicles (%)	1%	1%	3%	1%	3%	3%	3%	1%
Turn Type	Prot	Perm	Prot	Prot	NA	Prot	NA	Perm
Protected Phases	7		5	5	2	1	6	
Permitted Phases		4						6
Actuated Green, G (s)	14.9	15.1		13.5	31.4	2.8	20.7	20.7
Effective Green, g (s)	14.9	15.1		13.5	31.4	2.8	20.7	20.7
Actuated g/C Ratio	0.24	0.24		0.22	0.50	0.04	0.33	0.33
Clearance Time (s)	4.2	4.0		4.2	4.9	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	426	377		385	2534	78	1670	511
v/s Ratio Prot	c0.12			0.13	c0.28	0.03	c0.24	
v/s Ratio Perm		0.04						0.07
v/c Ratio	0.52	0.16		0.58	0.56	0.71	0.72	0.22
Uniform Delay, d1	20.7	18.6		21.9	10.7	29.4	18.3	15.0
Progression Factor	1.00	1.00		1.00	0.99	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2		2.3	0.3	25.1	1.5	0.2
Delay (s)	21.8	18.8		24.1	11.0	54.5	19.8	15.2
Level of Service	C	B		C	B	D	B	B
Approach Delay (s)	20.3				12.8		20.4	
Approach LOS	C				B		C	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	62.4	Sum of lost time (s)	13.3
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	0	0	112	0	0	91	25	59	1308	43	20	40	1204	13
Future Vol, veh/h	0	0	112	0	0	91	25	59	1308	43	20	40	1204	13
Conflicting Peds, #/hr	2	0	0	0	0	2	0	6	0	11	0	11	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	0	-	-	0	-	85	-	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	0	1	3	1	0	1	3	1
Mvmt Flow	0	0	122	0	0	99	27	64	1422	47	22	43	1309	14

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	-	-	668	-	-	748	966	1329	0	0	1072	1480	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.12	-	-	7.12	5.6	5.32	-	-	5.6	5.32	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.91	-	-	3.91	2.3	3.11	-	-	2.3	3.11	-	-
Pot Cap-1 Maneuver	0	0	345	0	0	306	467	273	-	-	408	230	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	-	343	-	-	302	283	283	-	-	244	244	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.2	22.6	1.4	1.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	283	-	-	343	302	244	-	-
HCM Lane V/C Ratio	0.323	-	-	0.355	0.328	0.267	-	-
HCM Control Delay (s)	23.7	-	-	21.2	22.6	25	-	-
HCM Lane LOS	C	-	-	C	C	D	-	-
HCM 95th %tile Q(veh)	1.4	-	-	1.6	1.4	1	-	-

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Traffic Volume (vph)	6	271	335	205	109	380	239	9	218	1035	194	8
Future Volume (vph)	6	271	335	205	109	380	239	9	218	1035	194	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	0.91	1.00	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1752	3505	1568	1752	3505	1568		1752	5036	1538	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00	1.00	
Satd. Flow (perm)		1752	3505	1568	1752	3505	1568		1752	5036	1538	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	295	364	223	118	413	260	10	237	1125	211	9
RTOR Reduction (vph)	0	0	0	168	0	0	208	0	0	0	109	0
Lane Group Flow (vph)	0	302	364	55	118	413	52	0	247	1125	102	0
Confl. Peds. (#/hr)											7	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot
Protected Phases	7	7	4		3	8		5	5	2		1
Permitted Phases				4			8				2	
Actuated Green, G (s)		16.0	24.6	24.6	11.7	20.3	20.3		14.0	29.1	29.1	
Effective Green, g (s)		16.0	24.6	24.6	11.7	20.3	20.3		14.0	29.1	29.1	
Actuated g/C Ratio		0.16	0.24	0.24	0.12	0.20	0.20		0.14	0.29	0.29	
Clearance Time (s)		4.2	4.9	4.9	4.2	4.9	4.9		4.2	4.9	4.9	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)		278	857	383	203	707	316		243	1456	444	
v/s Ratio Prot		c0.17	0.10		0.07	c0.12			c0.14	c0.22		
v/s Ratio Perm				0.03			0.03				0.07	
v/c Ratio		1.09	0.42	0.14	0.58	0.58	0.17		1.02	0.77	0.23	
Uniform Delay, d1		42.3	32.0	29.7	42.1	36.3	33.2		43.3	32.7	27.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2		78.9	0.3	0.2	4.2	1.2	0.2		62.0	2.6	0.3	
Delay (s)		121.2	32.4	29.9	46.3	37.6	33.4		105.3	35.3	27.5	
Level of Service		F	C	C	D	D	C		F	D	C	
Approach Delay (s)			61.9			37.5				45.2		
Approach LOS			E			D				D		

Intersection Summary			
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.6	Sum of lost time (s)	18.2
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	276	818	249
Future Volume (vph)	276	818	249
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.2	4.9	4.9
Lane Util. Factor	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00
Frt	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1752	5036	1568
Flt Permitted	0.95	1.00	1.00
Satd. Flow (perm)	1752	5036	1568
Peak-hour factor, PHF	0.92	0.92	0.92
Adj. Flow (vph)	300	889	271
RTOR Reduction (vph)	0	0	123
Lane Group Flow (vph)	309	889	148
Confl. Peds. (#/hr)	7		
Turn Type	Prot	NA	Perm
Protected Phases	1	6	
Permitted Phases			6
Actuated Green, G (s)	17.0	32.1	32.1
Effective Green, g (s)	17.0	32.1	32.1
Actuated g/C Ratio	0.17	0.32	0.32
Clearance Time (s)	4.2	4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0
Lane Grp Cap (vph)	296	1606	500
v/s Ratio Prot	c0.18	0.18	
v/s Ratio Perm			0.09
v/c Ratio	1.04	0.55	0.30
Uniform Delay, d1	41.8	28.3	25.7
Progression Factor	0.99	0.99	0.97
Incremental Delay, d2	64.2	0.4	0.3
Delay (s)	105.7	28.4	25.4
Level of Service	F	C	C
Approach Delay (s)		44.1	
Approach LOS		D	
Intersection Summary			

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	72	53
Average Queue (ft)	10	23
95th Queue (ft)	39	47
Link Distance (ft)	281	901
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Glenn Ave & Clinton Ave

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	LT	T	L	R
Maximum Queue (ft)	31	26	246	245	73	53
Average Queue (ft)	1	1	31	8	36	29
95th Queue (ft)	10	8	116	81	60	44
Link Distance (ft)	281	281	733	733	635	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					5	0
Queuing Penalty (veh)					3	0

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	R	R	UL	T	T	UL	T	TR
Maximum Queue (ft)	75	56	174	274	289	93	75	56
Average Queue (ft)	38	34	92	64	54	39	4	9
95th Queue (ft)	68	59	180	238	208	76	27	34
Link Distance (ft)	1033	1240		270	270		898	898
Upstream Blk Time (%)				5	0			
Queuing Penalty (veh)				17	1			
Storage Bay Dist (ft)			75			75		
Storage Blk Time (%)			31	0		2	0	
Queuing Penalty (veh)			114	0		9	0	

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	138	170	288	205	317	315	190	274	234	270	250
Average Queue (ft)	51	40	165	113	143	147	35	188	147	137	93
95th Queue (ft)	101	103	250	197	239	239	112	267	223	214	172
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)								1		0	
Queuing Penalty (veh)								4		1	
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)	2	0					1	44		21	7
Queuing Penalty (veh)	2	0					3	12		74	22

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	R	UL	T	TR	UL	T	T	TR
Maximum Queue (ft)	74	54	151	31	53	50	115	76	127
Average Queue (ft)	37	34	46	1	2	14	4	3	5
95th Queue (ft)	62	55	99	10	17	43	38	25	44
Link Distance (ft)	407	1233		570	570		608	608	608
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			85			75			
Storage Blk Time (%)			1				0		
Queuing Penalty (veh)			4				0		

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	T	T	R	UL	T	T	T
Maximum Queue (ft)	340	851	807	84	120	198	214	170	220	661	556	520
Average Queue (ft)	332	591	507	28	71	124	102	94	204	362	295	194
95th Queue (ft)	380	930	874	62	115	186	192	171	251	611	517	383
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	77		6				7	8	52	14		7
Queuing Penalty (veh)	168		5				18	15	165	31		15

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	UL	T	T	T	R
Maximum Queue (ft)	225	279	349	293	303	225
Average Queue (ft)	67	214	153	157	155	111
95th Queue (ft)	149	307	276	246	264	215
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		19	1		22	5
Queuing Penalty (veh)		47	3		53	12

Network Summary

Network wide Queuing Penalty: 799

Intersection: 1: San Pablo Ave & Clinton Ave

Movement	EB	WB	NB
Directions Served	T	LT	LR
Maximum Queue (ft)	55	94	55
Average Queue (ft)	2	8	32
95th Queue (ft)	18	44	58
Link Distance (ft)	1058	281	901
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Glenn Ave & Clinton Ave

Movement	WB	WB	NB	NB
Directions Served	LT	T	L	R
Maximum Queue (ft)	74	31	179	100
Average Queue (ft)	24	1	48	40
95th Queue (ft)	64	10	124	87
Link Distance (ft)	733	733	635	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				50
Storage Blk Time (%)			20	1
Queuing Penalty (veh)			11	0

Intersection: 3: Cambridge Ave & Blackstone Ave

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	R	R	UL	TR	UL	T	TR
Maximum Queue (ft)	120	54	94	23	31	52	21
Average Queue (ft)	65	32	37	1	11	2	1
95th Queue (ft)	109	58	73	8	34	17	10
Link Distance (ft)	1033	1240		270		898	898
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			75		75		
Storage Blk Time (%)			0				
Queuing Penalty (veh)			2				

Intersection: 4: Blackstone Ave & Weldon Ave

Movement	EB	EB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	UL	T	T	T	U	T	T	T	R
Maximum Queue (ft)	172	195	227	269	290	315	190	280	270	276	149
Average Queue (ft)	102	72	123	127	144	155	61	200	159	114	56
95th Queue (ft)	158	139	199	228	263	261	151	273	255	199	104
Link Distance (ft)		847		608	608	608		270	270	270	
Upstream Blk Time (%)								0	0	0	
Queuing Penalty (veh)								1	0	0	
Storage Bay Dist (ft)	105		395				100				100
Storage Blk Time (%)	7	1					1	38		11	1
Queuing Penalty (veh)	16	2					3	20		22	2

Intersection: 5: Blackstone Ave & University Ave

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	R	UL	T	T	UL	T	T	TR
Maximum Queue (ft)	72	76	94	53	31	75	96	28	51
Average Queue (ft)	45	40	33	2	1	33	6	1	2
95th Queue (ft)	67	68	68	17	10	59	39	9	19
Link Distance (ft)	407	1233		570	570		608	608	608
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			85			75			
Storage Blk Time (%)			1			1	0		
Queuing Penalty (veh)			2			5	0		

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	T	R	L	T	T	R	UL	T	T	T
Maximum Queue (ft)	340	623	559	128	194	180	189	152	220	576	563	303
Average Queue (ft)	269	250	202	50	84	107	89	65	182	290	250	164
95th Queue (ft)	409	607	499	97	160	169	163	123	261	513	454	247
Link Distance (ft)		2178	2178			1224	1224			2721	2721	2721
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	245			150	255			100	185			
Storage Blk Time (%)	41		1				4	3	38	4		4
Queuing Penalty (veh)	68		1				11	5	132	8		8

Intersection: 6: Blackstone Ave & McKinley Ave

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	UL	T	T	T	R
Maximum Queue (ft)	225	280	572	500	249	225
Average Queue (ft)	48	247	278	171	152	86
95th Queue (ft)	111	328	571	316	218	192
Link Distance (ft)			570	570	570	
Upstream Blk Time (%)			2			
Queuing Penalty (veh)			8			
Storage Bay Dist (ft)	160	205				105
Storage Blk Time (%)		51	0		25	2
Queuing Penalty (veh)		139	0		62	4

Network Summary

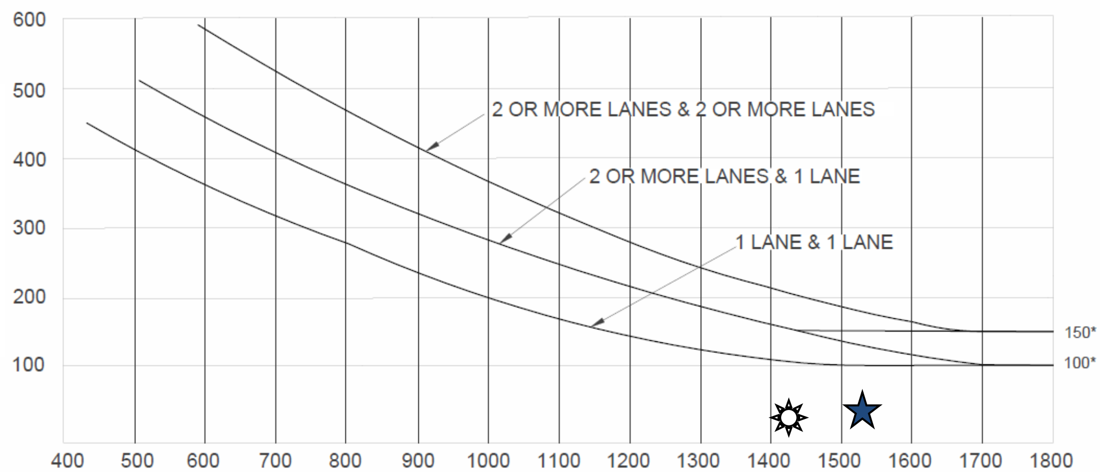
Network wide Queuing Penalty: 535

Appendix K: Signal Warrants

Warrant 3: Peak Hour (Urban)

Existing Traffic Conditions
1. San Pablo Avenue / Clinton Avenue
AM (PM) Peak Hour

San Pablo Avenue
Highest Approach Volume =
20 (28) VPH



Clinton Avenue Total of Both Approaches =
1425 (1562) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

☼ **AM Peak Hour – Signal Warrant is Not Met**
★ **PM Peak Hour – Signal Warrant is Not Met**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Existing Traffic Conditions

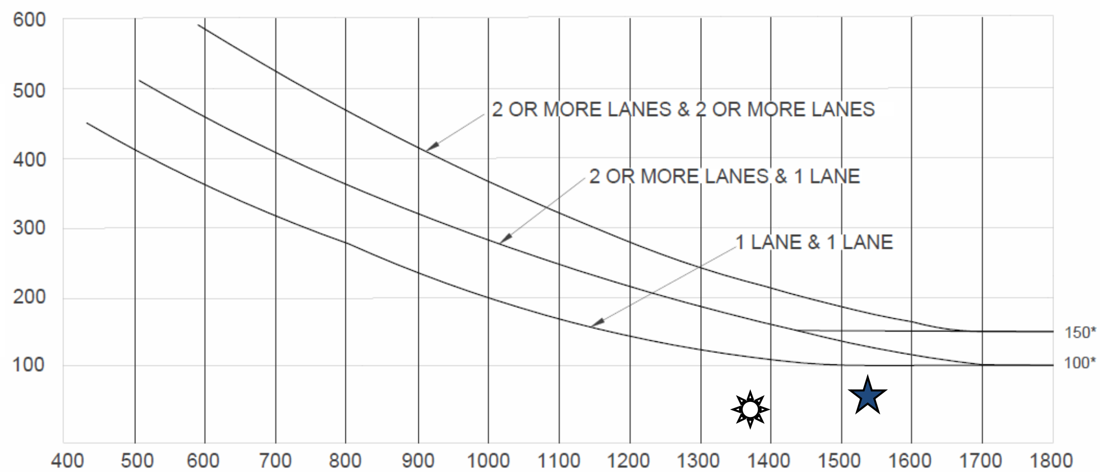
2. Glenn Avenue / Clinton Avenue

AM (PM) Peak Hour

Glenn Avenue

Highest Approach Volume =

55 (60) VPH



Clinton Avenue Total of Both Approaches =

1387 (1539) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

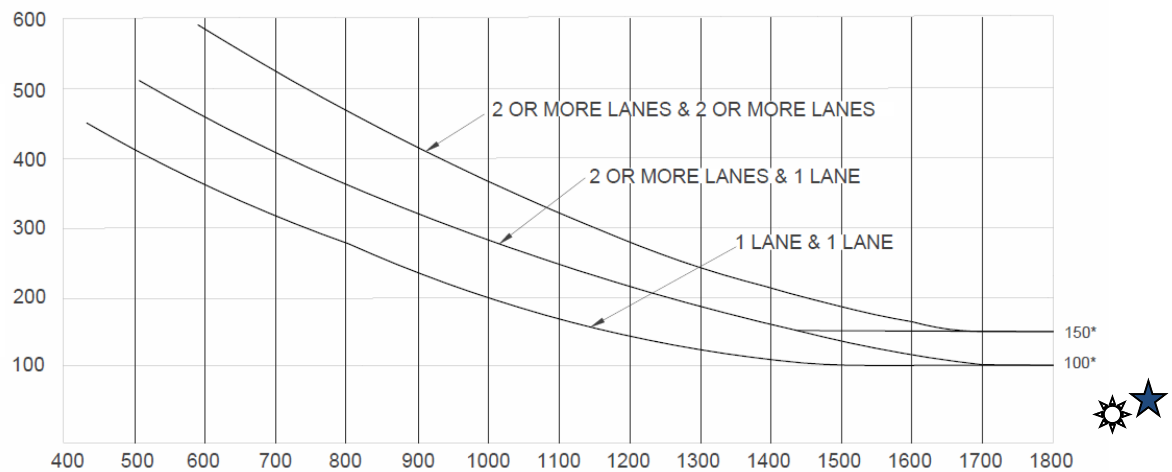
Warrant 3: Peak Hour (Urban)

Existing Traffic Conditions
3. Blackstone Avenue / Cambridge Avenue
AM (PM) Peak Hour

Cambridge Avenue

Highest Approach Volume =

33 (42) VPH



Blackstone Avenue Total of Both Approaches =

1904 (2192) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

☼ **AM Peak Hour – Signal Warrant is Not Met**

★ **PM Peak Hour – Signal Warrant is Not Met**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Existing Traffic Conditions

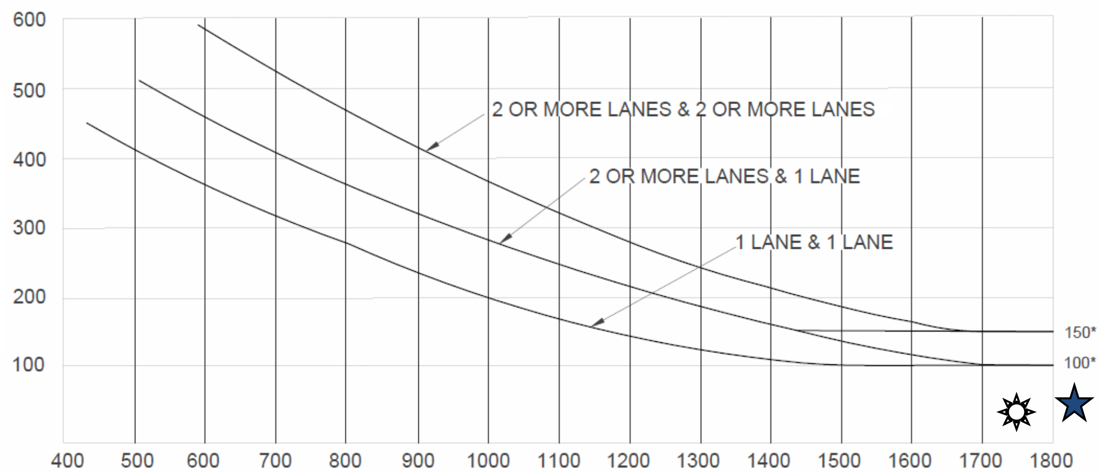
5. Blackstone Avenue / University Avenue

AM (PM) Peak Hour

University Avenue

Highest Approach Volume =

39 (57) VPH



Blackstone Avenue Total of Both Approaches =

1759 (2111) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

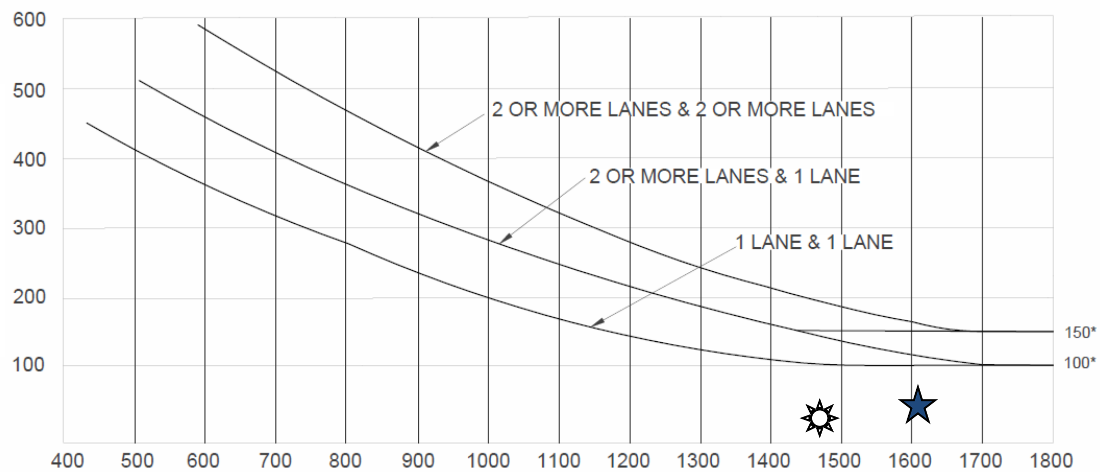
PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Existing plus Project Traffic Conditions
1. San Pablo Avenue / Clinton Avenue
AM (PM) Peak Hour

San Pablo Avenue Highest Approach Volume = 30 (40) VPH



Clinton Avenue Total of Both Approaches = 1479 (1608) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

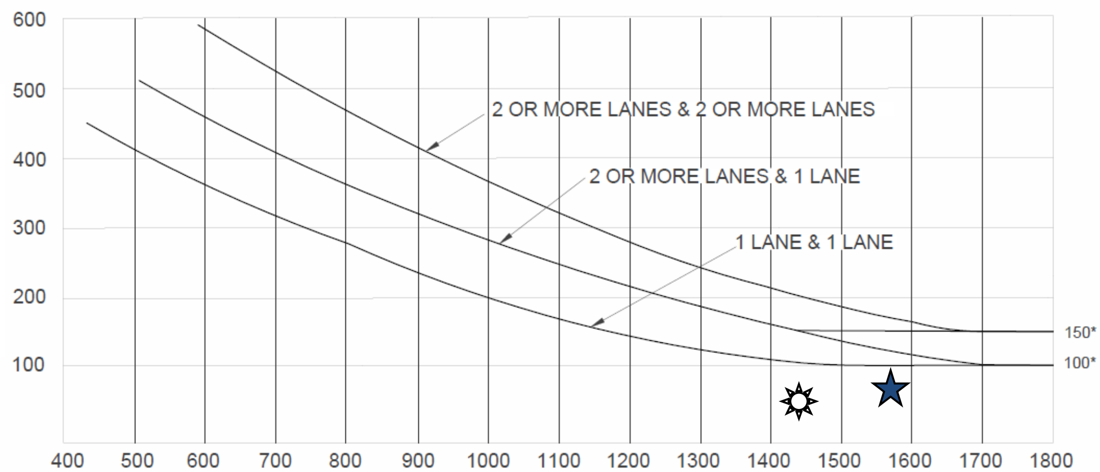
PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Existing plus Project Traffic Conditions
2. Glenn Avenue / Clinton Avenue
AM (PM) Peak Hour

Glenn Avenue
Highest Approach Volume =
62 (71) VPH



Clinton Avenue Total of Both Approaches =
1439 (1580) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met
PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

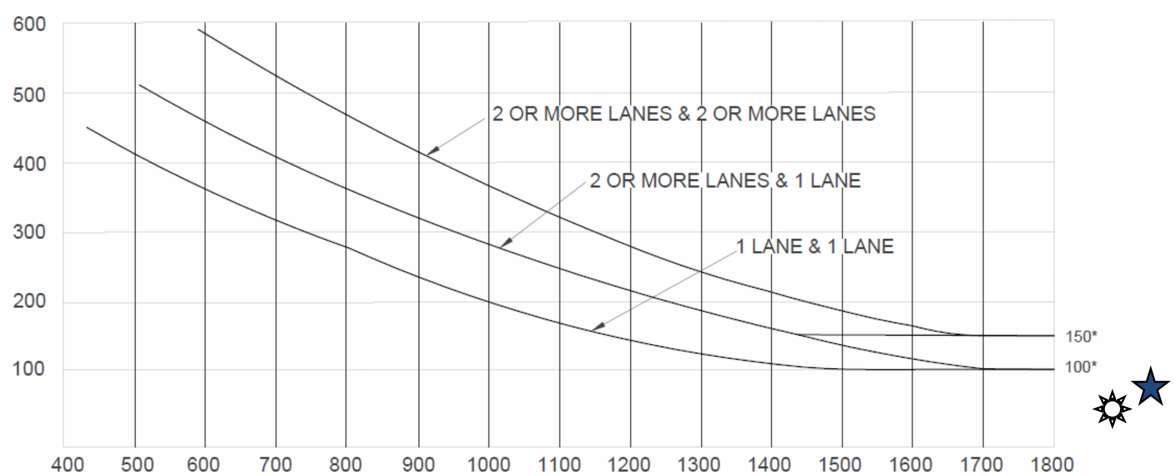
Warrant 3: Peak Hour (Urban)

Existing plus Project Traffic Conditions
3. Blackstone Avenue / Cambridge Avenue
AM (PM) Peak Hour

Cambridge Avenue

Highest Approach Volume =

49 (93) VPH



Blackstone Avenue Total of Both Approaches =

2111 (2370) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

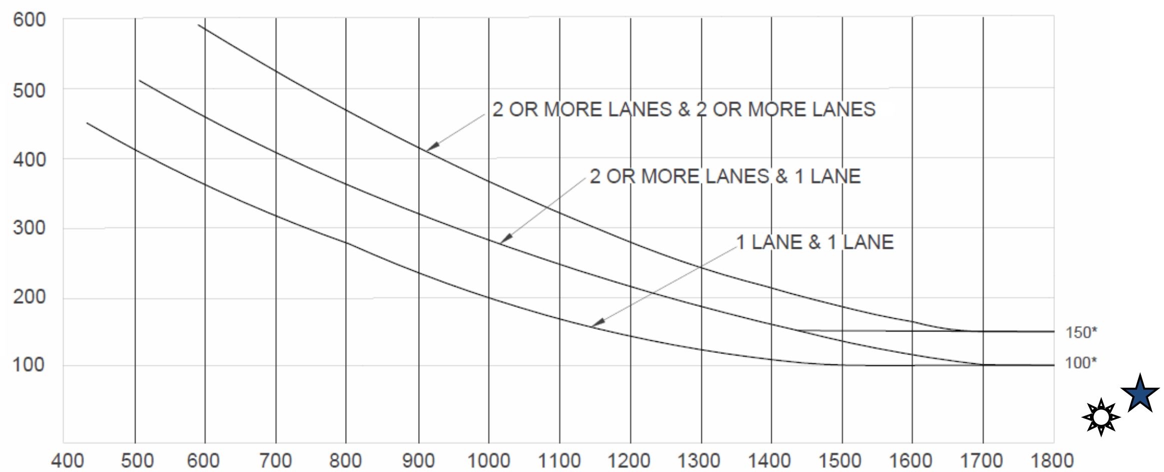
PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Existing plus Project Traffic Conditions
5. Blackstone Avenue / University Avenue
AM (PM) Peak Hour

University Avenue
Highest Approach Volume =
39 (56) VPH



Blackstone Avenue Total of Both Approaches =
2070 (2416) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met
PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
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November 7, 2014

JLB TRAFFIC ENGINEERING, INC.

516 W. Shaw Ave., Ste. 103
www.JLBtraffic.com
Fresno, CA 93704
info@JLBtraffic.com
(559) 570-8991

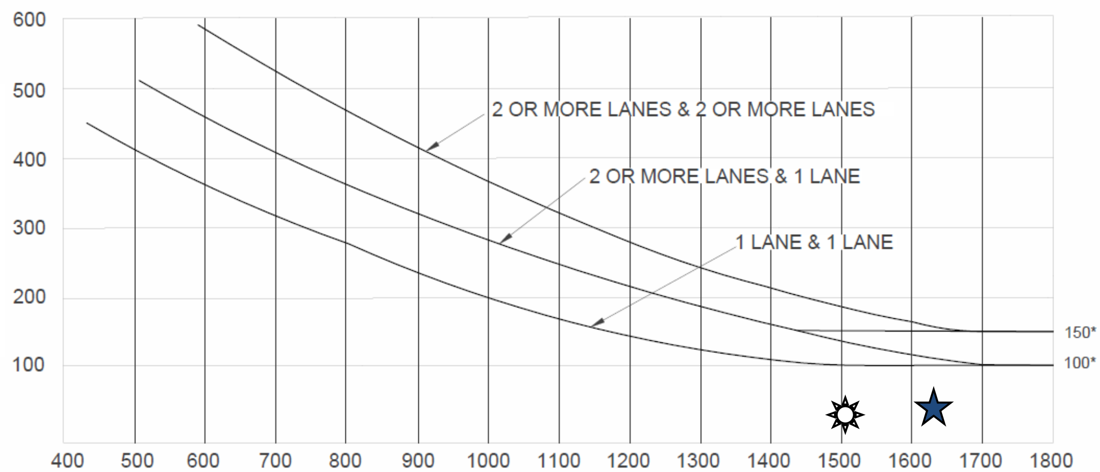
Warrant 3: Peak Hour (Urban)

Near Term plus Project Traffic Conditions
1. San Pablo Avenue / Clinton Avenue
AM (PM) Peak Hour

San Pablo Avenue

Highest Approach Volume =

30 (40) VPH



Clinton Avenue Total of Both Approaches =

1506 (1626) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

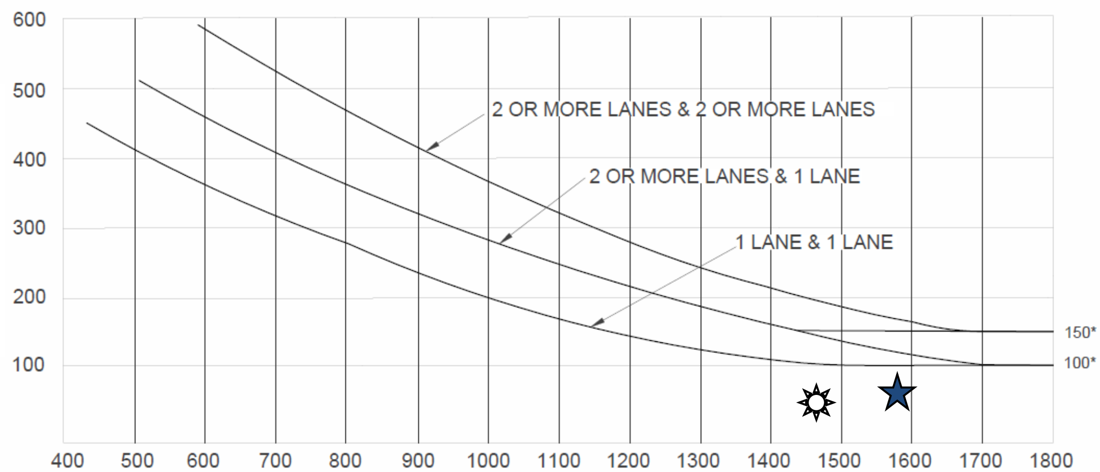
PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Near Term plus Project Traffic Conditions
2. Glenn Avenue / Clinton Avenue
AM (PM) Peak Hour

Glenn Avenue Highest Approach Volume = 63 (71) VPH



Clinton Avenue Total of Both Approaches = 1466 (1598) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
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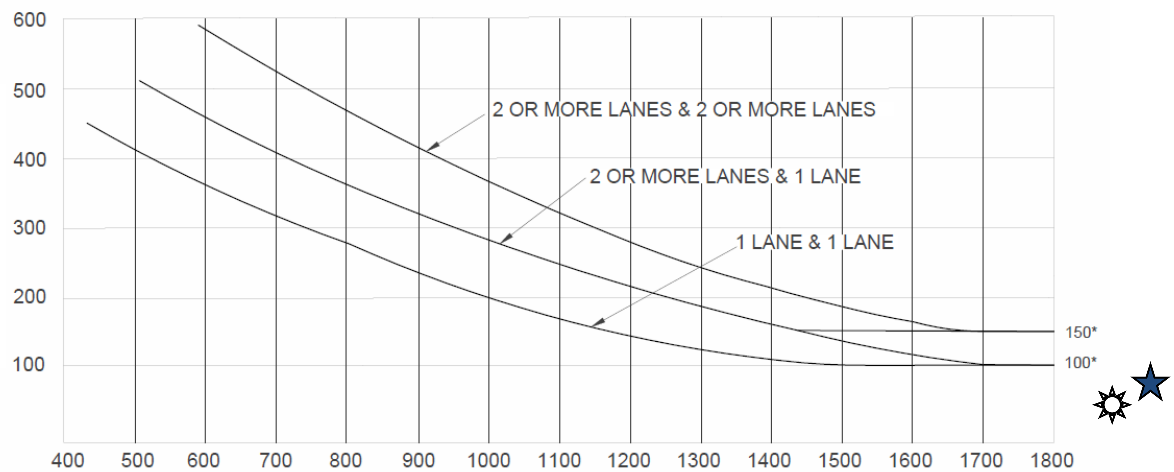
JLB TRAFFIC ENGINEERING, INC.
www.JLBtraffic.com
info@JLBtraffic.com
516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

Warrant 3: Peak Hour (Urban)

Near Term plus Project Traffic Conditions
3. Blackstone Avenue / Cambridge Avenue
AM (PM) Peak Hour

Cambridge Avenue
Highest Approach Volume =
50 (94) VPH



Blackstone Avenue Total of Both Approaches =
2239 (2452) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

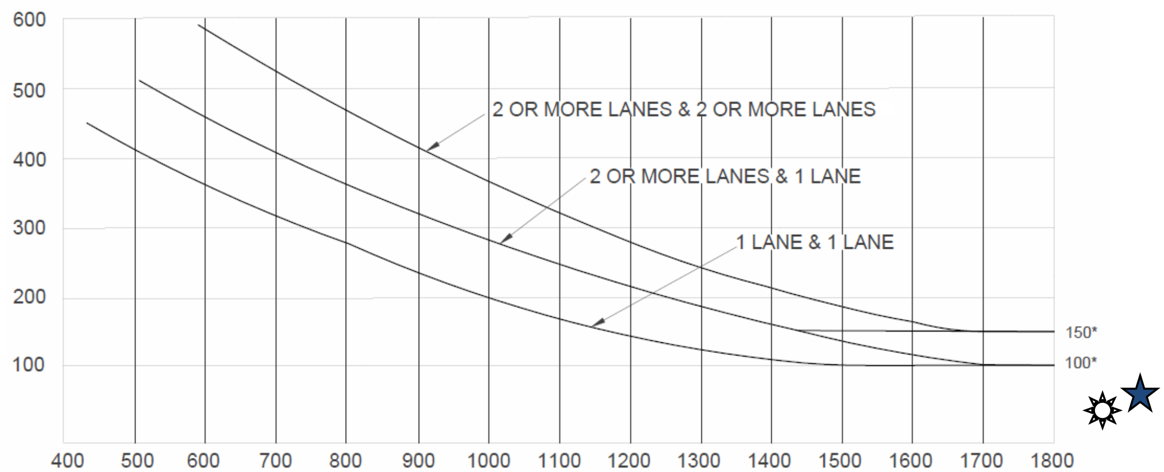
AM Peak Hour – Signal Warrant is Not Met
PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

Warrant 3: Peak Hour (Urban)

Near Term plus Project Traffic Conditions
5. Blackstone Avenue / University Avenue
AM (PM) Peak Hour

University Avenue Highest Approach Volume = 41 (57) VPH



Blackstone Avenue Total of Both Approaches = 2184 (2469) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

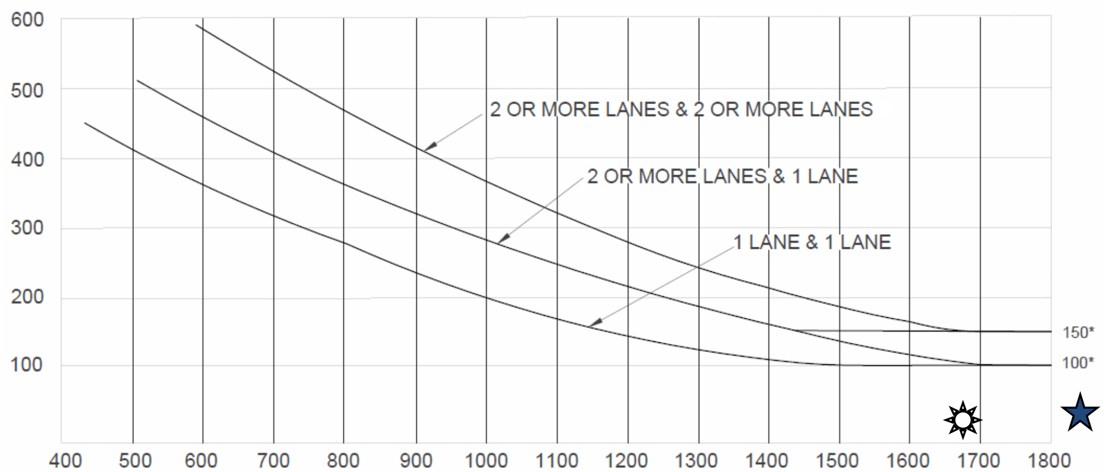
Warrant 3: Peak Hour (Urban)

Cumulative Year 2035 No Project Traffic Conditions
1. San Pablo Avenue / Clinton Avenue
AM (PM) Peak Hour

San Pablo Avenue

Highest Approach Volume =

20 (28) VPH



Clinton Avenue Total of Both Approaches =

1675 (1873) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

JLB TRAFFIC ENGINEERING, INC.

www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

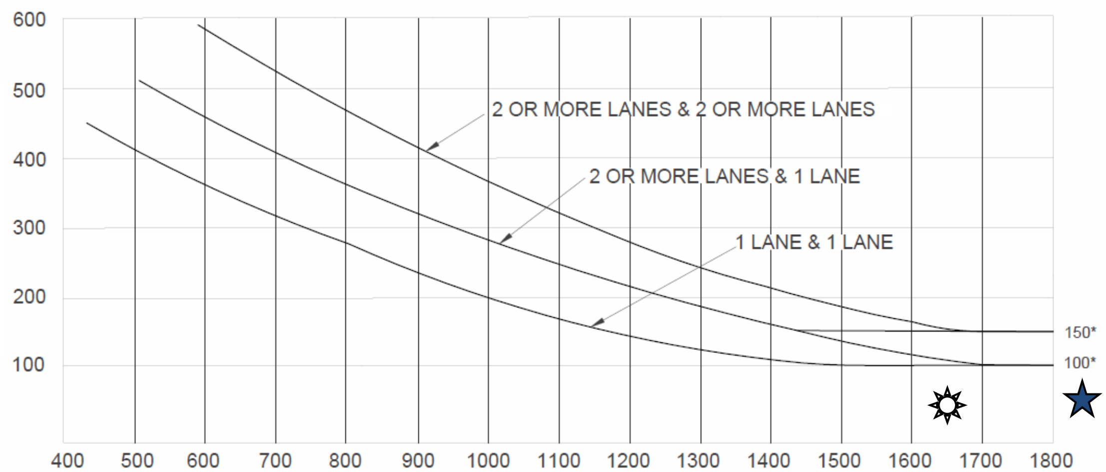
Fresno, CA 93704

(559) 570-8991

Warrant 3: Peak Hour (Urban)

Cumulative Year 2035 No Project Traffic Conditions
2. Glenn Avenue / Clinton Avenue
AM (PM) Peak Hour

Glenn Avenue Highest Approach Volume = 56 (61) VPH



Clinton Avenue Total of Both Approaches = 1654 (1867) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

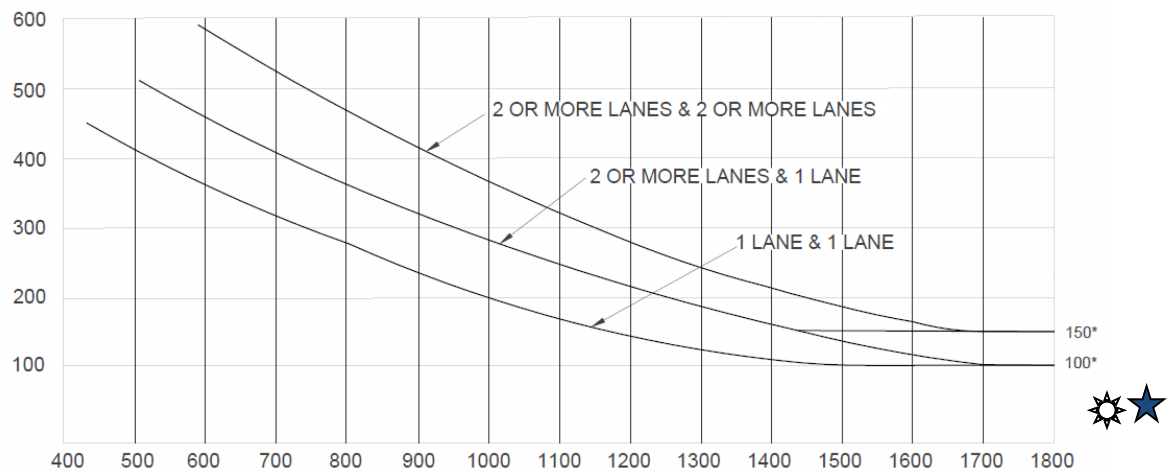
Warrant 3: Peak Hour (Urban)

Cumulative Year 2035 No Project Traffic Conditions
3. Blackstone Avenue / Cambridge Avenue
AM (PM) Peak Hour

Cambridge Avenue

Highest Approach Volume =

42 (43) VPH



Blackstone Avenue Total of Both Approaches =

2513 (2601) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

☼ **AM Peak Hour – Signal Warrant is Not Met**

★ **PM Peak Hour – Signal Warrant is Not Met**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

JLB TRAFFIC ENGINEERING, INC.

www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

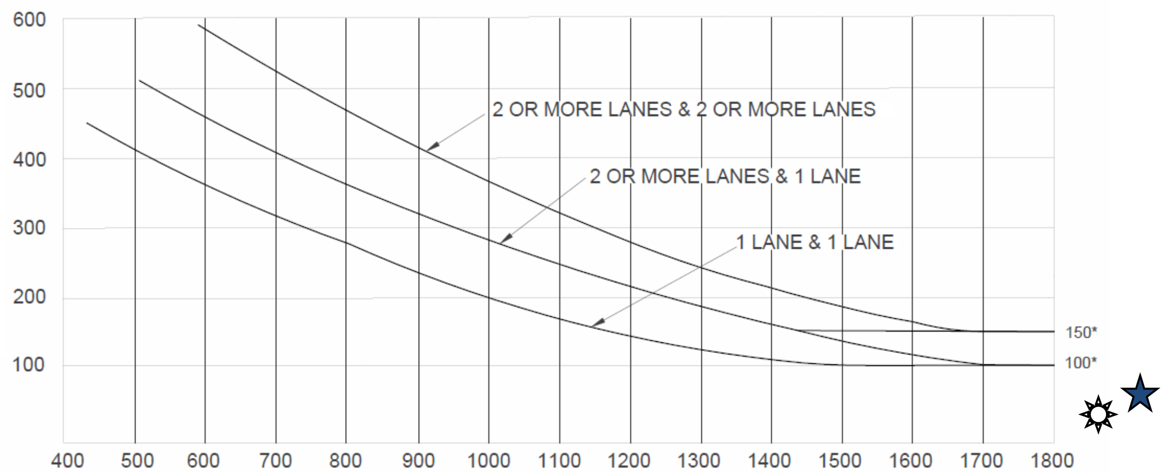
Fresno, CA 93704

(559) 570-8991

Warrant 3: Peak Hour (Urban)

Cumulative Year 2035 No Project Traffic Conditions
5. Blackstone Avenue / University Avenue
AM (PM) Peak Hour

University Avenue Highest Approach Volume = 42 (64) VPH



Blackstone Avenue Total of Both Approaches = 2178 (2327) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

☼ **AM Peak Hour – Signal Warrant is Not Met**

★ **PM Peak Hour – Signal Warrant is Not Met**

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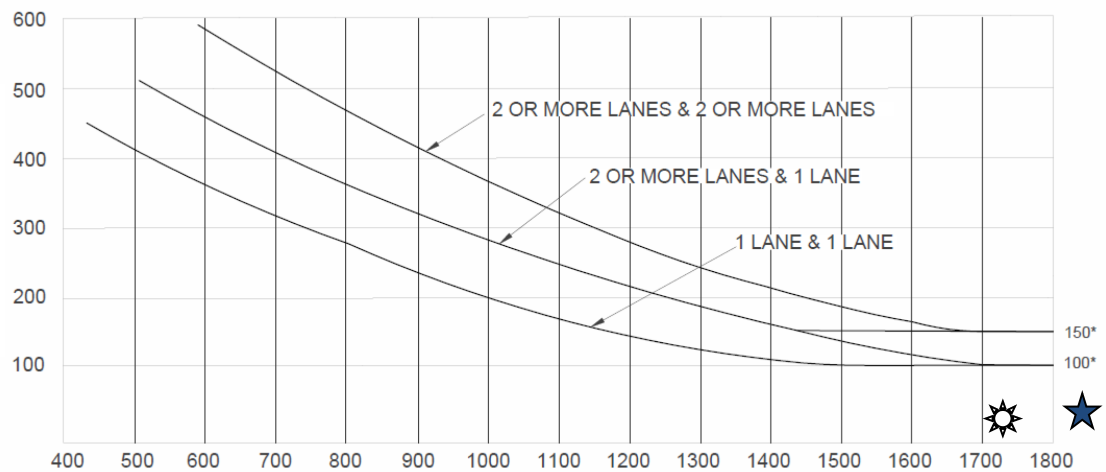
Warrant 3: Peak Hour (Urban)

Cumulative Year 2035 plus Project Traffic Conditions
1. San Pablo Avenue / Clinton Avenue
AM (PM) Peak Hour

San Pablo Avenue

Highest Approach Volume =

30 (40) VPH



Clinton Avenue Total of Both Approaches =

1729 (1919) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
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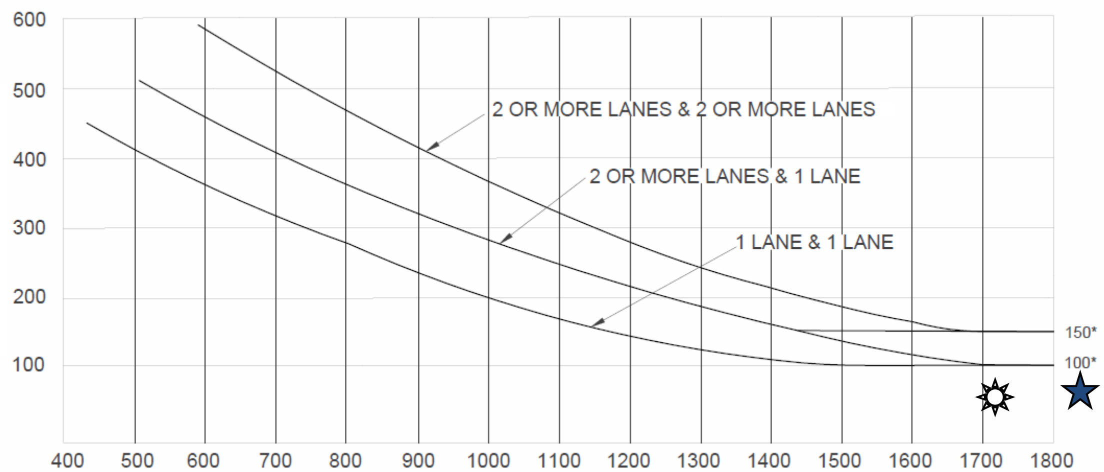
November 7, 2014

Warrant 3: Peak Hour (Urban)

Cumulative Year 2035 plus Project Traffic Conditions
2. Glenn Avenue / Clinton Avenue
AM (PM) Peak Hour

Glenn Avenue Highest Approach Volume = 63 (71) VPH



Clinton Avenue Total of Both Approaches =

1706 (1908) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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Part 4: Highway Traffic Signals
November 7, 2014

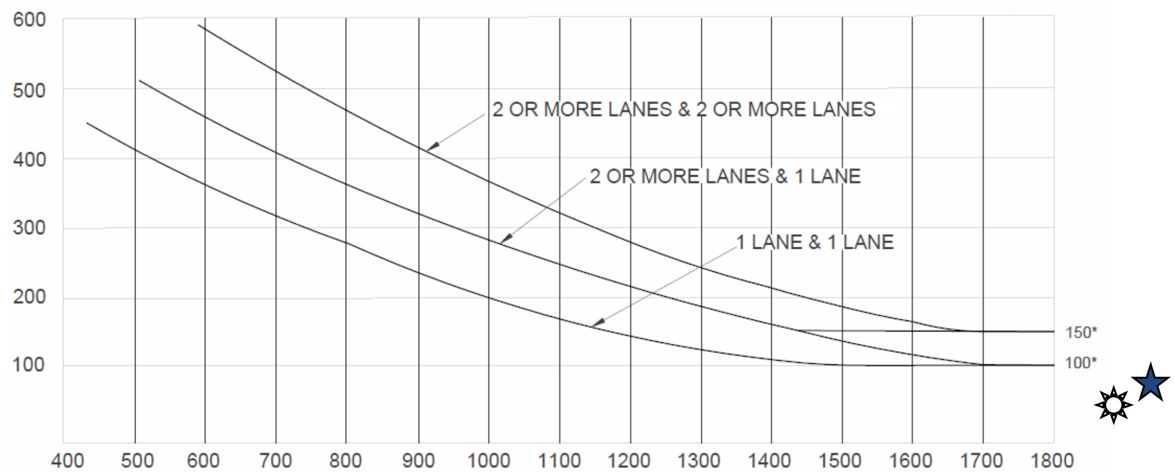
Warrant 3: Peak Hour (Urban)

Cumulative Year 2035 plus Project Traffic Conditions
3. Blackstone Avenue / Cambridge Avenue
AM (PM) Peak Hour

Cambridge Avenue

Highest Approach Volume =

50 (94) VPH



Blackstone Avenue Total of Both Approaches =

2720 (2779) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

☼ **AM Peak Hour – Signal Warrant is Not Met**

★ **PM Peak Hour – Signal Warrant is Not Met**

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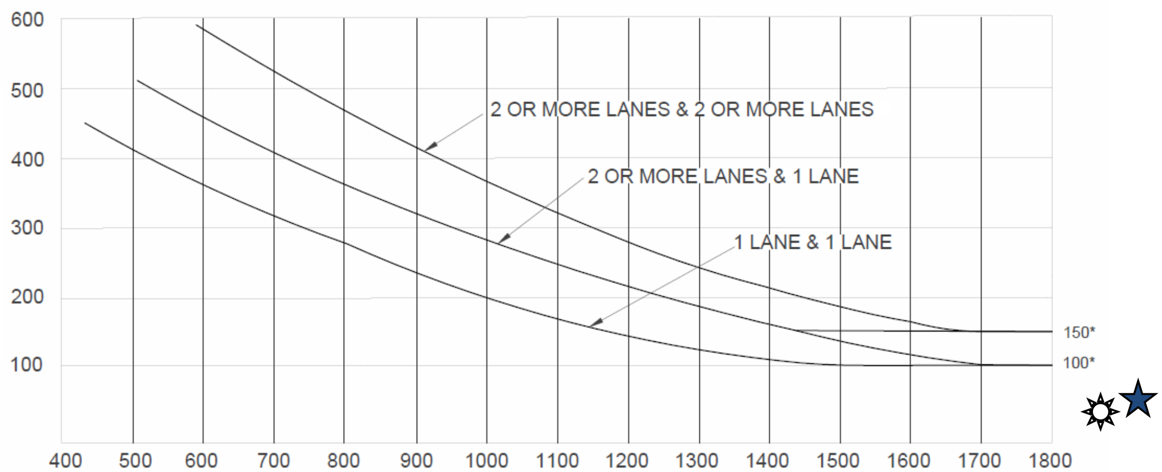
Warrant 3: Peak Hour (Urban)

Cumulative Year 2035 plus Project Traffic Conditions
5. Blackstone Avenue / University Avenue
AM (PM) Peak Hour

University Avenue

Highest Approach Volume =

45 (61) VPH



Blackstone Avenue Total of Both Approaches =

2489 (2632) VPH

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
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